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PC WORLD

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FEBRUARY 1998

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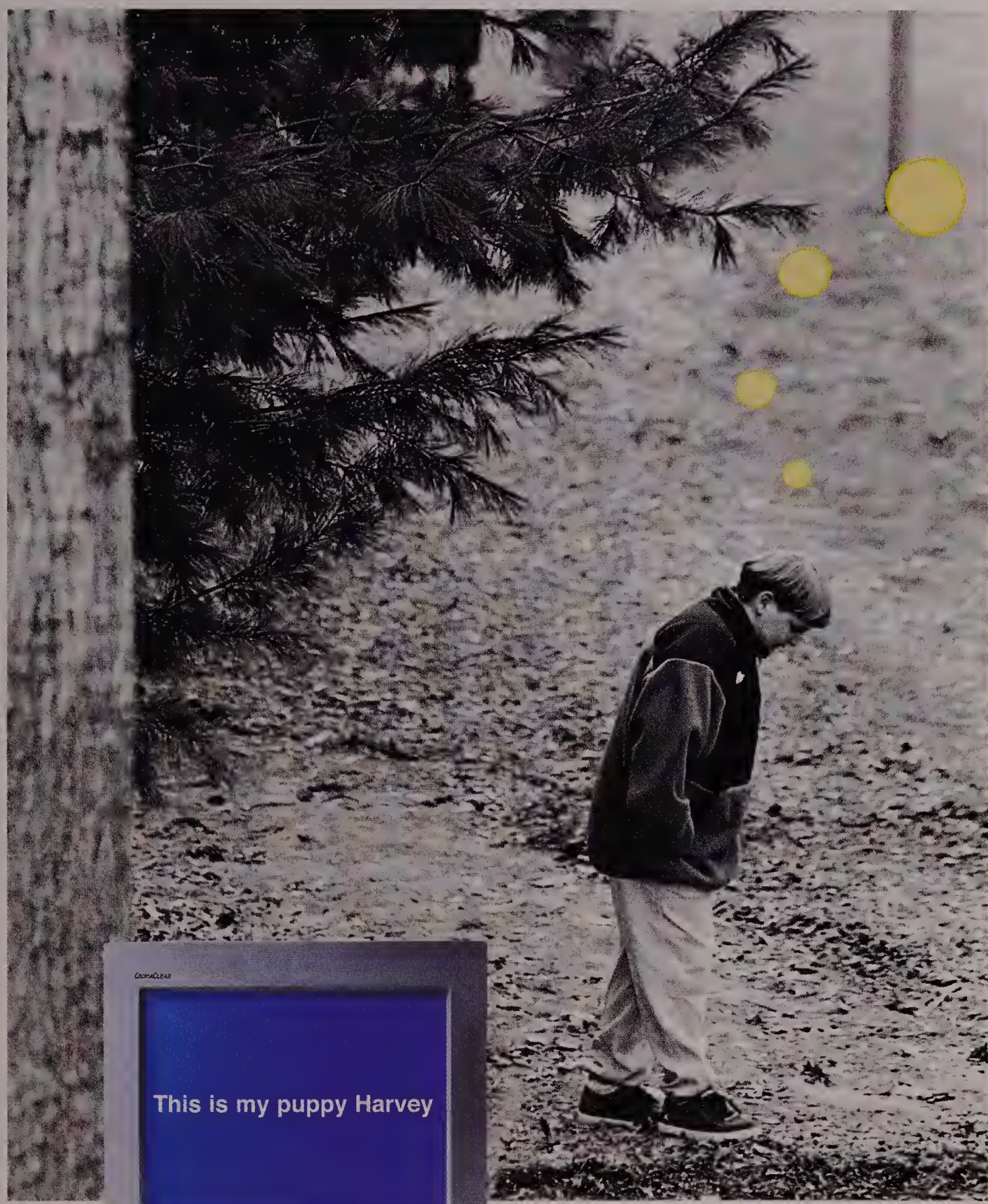

1 THIS IS CHRISTIAN.

He can see, hear, feel, touch, but he cannot speak. He was born with autistic tendencies that cut him off from the world around him.

Until he found this window.

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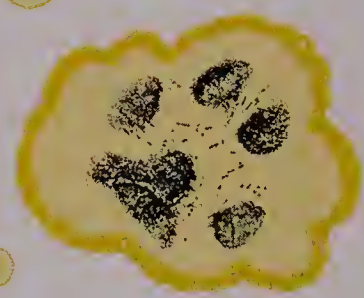


2 A TEACHER DISCOVERED *that Christian would respond to images from his life. She put visual cues to the story of his new puppy on a special keyboard.*

3 THE MONITOR BECAME HIS VOICE. *With it he makes class reports and conversation. With it, Christian, 11, has been in the regular Osterville, MA public school since first grade.*

4 WITH THE PICTURES, HE MADE SENTENCES. *With the sentences, he made friends. Christian's monitor is the window between his non-verbal world and the speaking world of his friends. Through it, he teaches them many things.*

NEC MultiSync Monitors
E and A Series

THE MONITORS THAT ARE BEST FOR CHRISTIAN'S NEEDS *can also speak to yours. Introducing the NEC MultiSync® Enterprise and Advanced Series, the monitors for people looking for superior, lifelike images. And the monitors for people who want the kind of flexibility that super high resolutions and refresh rates ensure.*

OSM™ (On-Screen Manager) controls make image adjustments easy. Plus, select Enterprise monitors feature CROMACLEAR™ CRT, for unparalleled focus, contrast and intense color saturation. And, of course, the industry-leading NEC warranty includes 3 years parts, labor and CRT.

For more information on the new performance-driven MultiSync Enterprise and value-oriented Advanced Series call 1-800-NEC-INFO or visit www.nec.com.

MULTISYNC® MONITORS

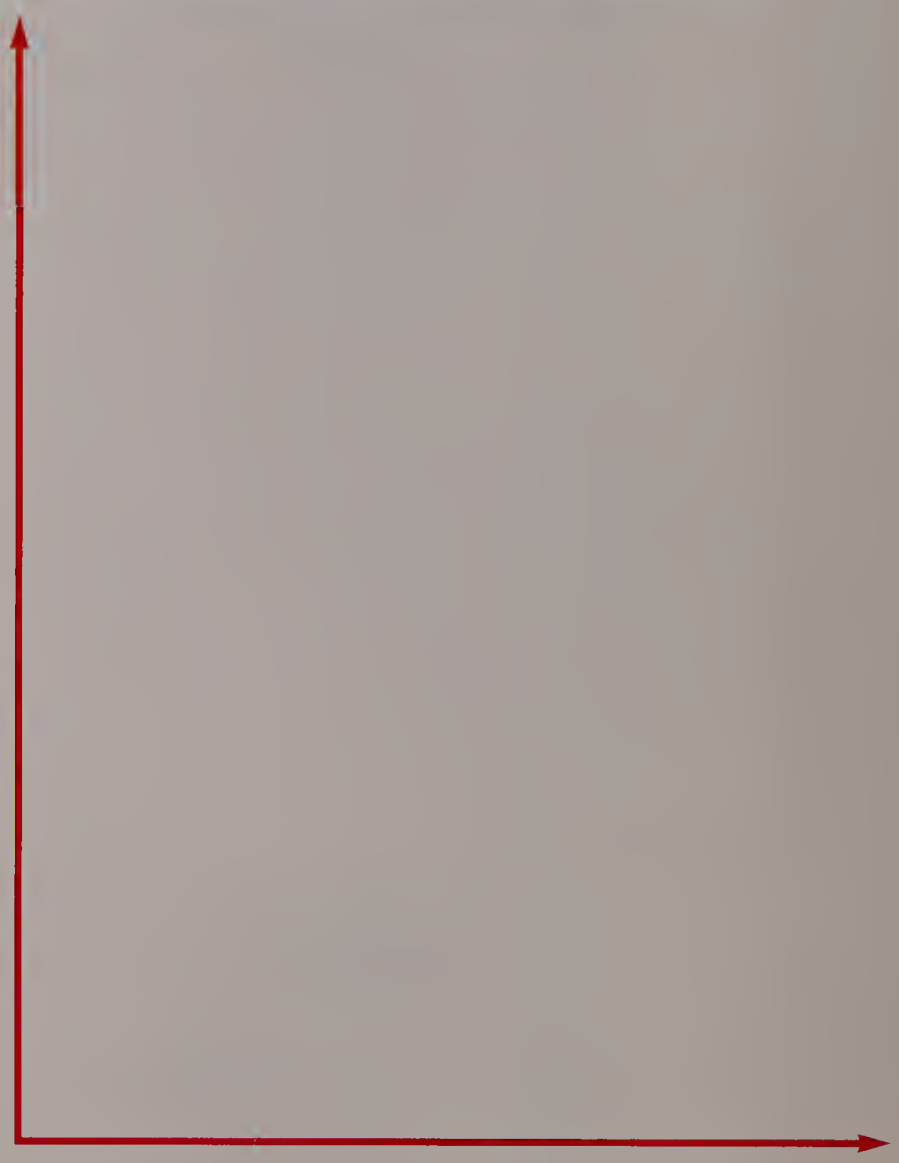
	Max Res	Bandwidth	CRT Type	Pitch
A500	1280 x 1024 @ 60Hz	112MHz	Dot Trio	0.28mm dot
A700	1280 x 1024 @ 65Hz	119MHz	Dot Trio	0.28mm dot
E500	1280 x 1024 @ 65Hz	119MHz	CROMACLEAR	0.25mm mask
E700	1600 x 1200 @ 65Hz	177MHz	CROMACLEAR	0.25mm mask
E1100	1600 x 1200 @ 65Hz	177MHz	Dot Trio	0.28mm dot

Expect more. Experience more.

NEC

Circle 205 on reader service card

Christian Murphy was non-verbal.
He lived with a wall between himself and the world.



Our new 7-color printer.

Our exclusive Seven-Color Ink System mixes more inks to deliver unprecedented print quality.

The BJC-7000's unique dual printhead design has more than 1,000 nozzles for enhanced detail, smoother color gradation and crisp, sharp text.

Canon Creative 3†† software allows you to create, personalize and print brochures, stationery, flyers, T-shirts and more.

Our exclusive Plain-Paper Optimized Printing technology (P-POP), featuring Ink Optimizer,™ gives true photo-quality printing on plain paper† with 100% water resistance.

Imagine printing to the edge of an 8-1/2" x 11" page. While not shown here, our exclusive Edge-To-Edge Printing and optional LetterPlus paper make it easy.

We have something they don't. The Canon BJC-7000 Color Bubble Jet™ printer has arrived. Featuring our exclusive Seven-Color Ink System, it sets a new industry standard in photo-realistic color printing. By mixing seven inks, we've achieved colors unprecedented in range, depth and richness, for image quality that matches that of a real photograph. And with Plain-Paper Optimized Printing™ (P-POP™), the BJC-7000 can print these incredible

shown printed on Canon HR-101 paper, sold separately. ††Software designed for use with Windows® 95, and available on CD-ROM only. *Manufacturer's suggested retail price. Dealer prices may vary. ©1997 Canon Computer

Their new 7-color printer.

There's one important difference between our Seven-Color Ink System and theirs: we have a Seven-Color Ink System.

Let's just say they're lacking in the nozzle department.

Print true photo-quality output on plain paper. Oh, wait, that's the printer on the other page. Never mind.

Do they have Canon Creative 3 software? (Here's a hint: No.)

No Edge-To-Edge Printing. But you can always fill in the borders with colored pencils.

images on plain paper, with 100% water resistance. You won't find all of these features in any other ink jet printer. As for the price, at $449,* we'd ask you to compare it to the other printers in its class. But that's impossible. To get more information or to locate a Canon dealer in your area, visit our Web site at www.ccsi.canon.com or call us at 1-800-848-4123.

See what we mean.™

Canon

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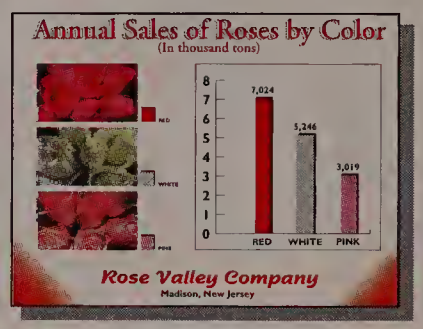
Documents/ Publications



Databases/ Spreadsheets

From internal newsletters to company reports, wherever there's a story to tell, you can tell it better with pictures taken with a Sony Digital Mavica.

Digital Mavica is compatible[2] with Windows® 3.1/Windows® 95/ Windows NT® 4.0 or Mac™ OS System 7.5.

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1. Continuous recording (10-second intervals with flash off) 2. Some systems may require supplied ArcSoft™ software

SONY

like never before!

SHOOT!

Point and shoot!

With Sony's new Digital Mavica® Still Camera, adding pictures and images to make professional looking documents has never been easier. Digital Mavica records on a standard computer floppy so you can play it back on virtually any PC. No more hassles with cables, interfaces or drivers.

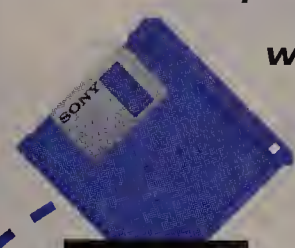
Finally, a Digital Still Camera with Real Camera Features like a 10x power zoom lens with 1" macro capabilities and auto-focus, auto-white balance and auto-iris for proper exposure and a built-in flash and self-timer. Five Camera Mode Settings allow control of prevailing light conditions:

- Portrait • Landscape
- Beach and Ski • Sports
- Sunset and Moon

10-to-1 ZOOM LENS

Never miss a shot! Sony's InfoLithium™ Rechargeable Battery allows up to 500 continuous shots[1] with a single charge as it powers a large 2.5" color LCD screen for composing, monitoring and playback.

Digital Mavica is compatible with virtually any PC. It uses universally compatible high density 3.5" standard computer floppies that can hold up to 20 high resolution or up to 40 standard resolution images in 24 bit color, 640 x 480 (VGA) JPEG format.



STORE!

A single disk can store up to 40 images!

Slip the floppy into a PC and watch the work come alive. Digital Mavica is compatible[2] with Windows®3.1/Windows® 95 /Windows NT®4.0 or Mac™ OS System 7.5. Add images to your spreadsheets, newsletters, Websites or any popular imaging software. Digital Mavica also comes with ArcSoft PhotoStudio for creative options to manipulate images, add text and change backgrounds.

If you can picture it on a floppy, you can see it in your work!

MICROSOFT® WINDOWS™ COMPATIBLE 32-Bit Application

Mac™ OS

ARCSOFT PhotoStudio

SHOW!

Watch your work come alive!

Digital Mavica®

Imagine That. On a Floppy.™

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PC WORLD

FEBRUARY

VOLUME 16 ◆ NUMBER 2

COVER STORY

122 **STORE WARS: THE BEST AND WORST PLACES TO BUY A PC**

CONSUMER ISSUES

What's the best way to buy a new computer? By direct mail? Online? At your local superstore? *PC World* operatives went undercover to buy systems from 15 different sources, rating everything from sales advice and selection to delivery times and return policies. Find out where they found buying PCs a pleasure...and a pain.

FEATURES

138 **TOO MUCH OF A GOOD THING?**

REVIEW

online

Think about it: Do you really need a disk-hogging, processor-sapping updated office suite? We pick the best word processor, spreadsheet, database, presentation package, and personal information manager, and figure out if the latest suites from Microsoft, Lotus, and Corel are really worth it.

159 **SNAP JUDGMENTS**

REVIEW

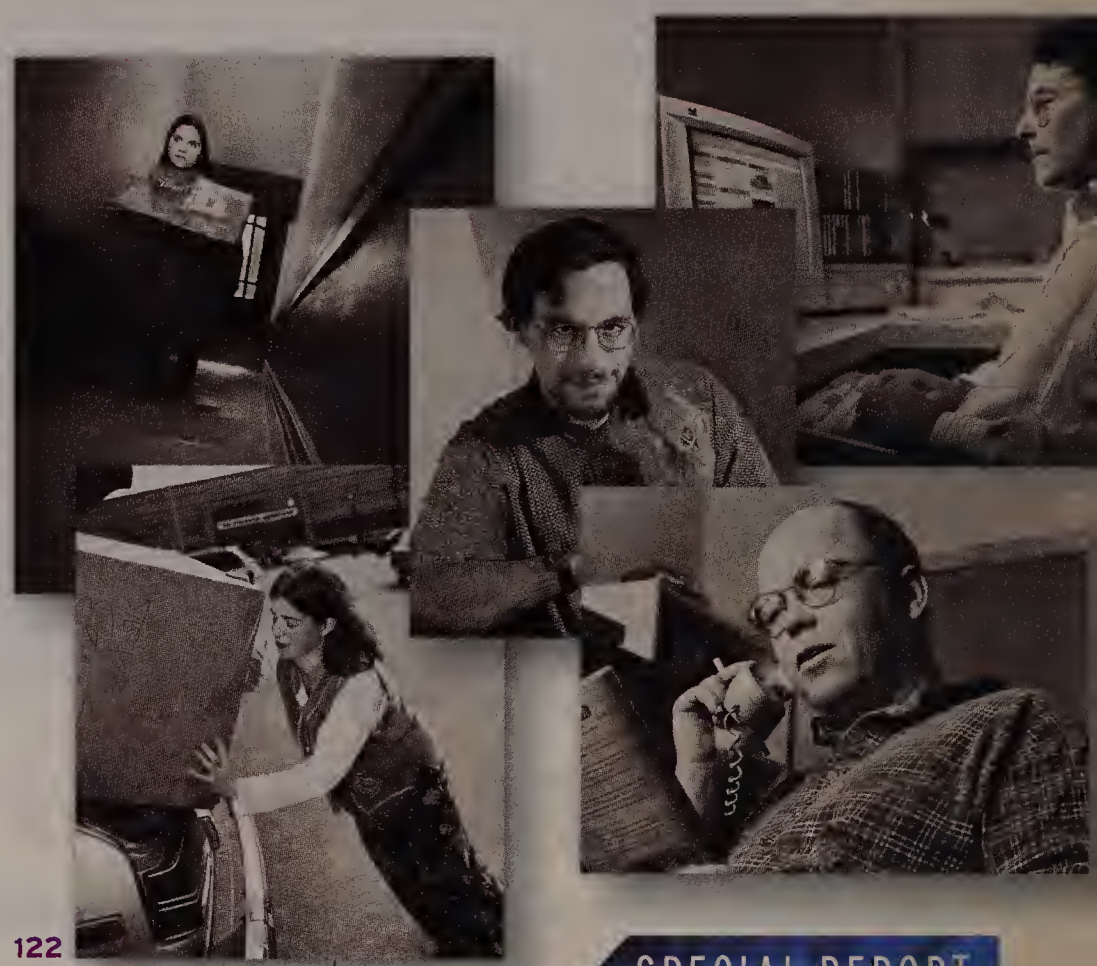
online

Armed with ten of the latest digital cameras, we went straight to the people—a small-office manager, a Web developer, a photo hobbyist—to see which models couple high-quality photos with convenience. And although our Best Buy was a popular choice, there may still be reasons to stick with old-fashioned film.

189 **CHEAP SCANS**

REVIEW

With personal scanner prices in free fall, getting photos, text pages, and more into your PC is finally cheap and easy. *PC World's* Steve Bass took 11 new scanners on a test drive and found Best Buys under $300 that won't bust budgets.



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online

Additional material available on PC World Online: www.pcworld.com

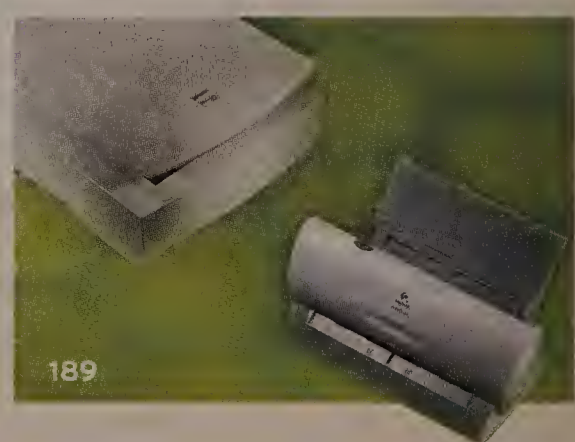
SPECIAL REPORT

THE WEB AND YOU

207 **WHY CAN'T YOU GET FASTER WEB ACCESS?**

online

Fast Internet access can be yours, but obstacles abound—from where you live to what you have to spend. Here's how to figure out if modem, ISDN, cable, satellite, or ADSL is the best choice for Web access in your neck of the woods.



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COVER *Digital composition by Jeff Berlin*

ICONS: JEFFREY PELO

TOP OF THE NEWS

58 TELECOM REFORM: WHERE ARE THE CHOICES, THE LOWER PRICES?
The telecom act promised lower rates and more choices for phone and Web services. But as reforms stall, impatient innovators gear up to push the system or circumvent it.

63 MMX-266 NOTEBOOKS: TINY KICK
New PMMX-266, AMD K6 notebooks barely beat cheaper 233-MMX models.

64 JUSTICE VS. MICROSOFT
Ordering Microsoft to stop making PC vendors bundle IE 4.0 with Windows, Feds could alter plans for Win 98.

68 1040, BUDDY: TAX SOFTWARE
Filing versions of TaxCut, TurboTax include free electronic filing.

72 LIKE CHEAP PRINTER CARTRIDGES?
Lawsuits could mean higher prices.

76 $250 COMPUTER DOESN'T COMPUTE
The consumer version of the NC disappoints.

78 32X CD-ROMS ADD LITTLE VALUE
First drives show few advantages over 24X.

80 NEW WEB NAME GAME
Changes in naming process will add choice.

NEW PRODUCTS

100 Akia Mystique M233, Hitachi VisionDesk
101 Eudora Pro 4.0 e-mail package
102 DataViz Conversion Plus 4.0, Verity KeyView Pro 6.0 utilities
106 Storm EasyPhoto ImageWave, Plustek OpticPro 600P; Lexmark Optra S 1620
108 Visto Briefcase; Microsoft Outlook 98
110 Gateway 2000 Solo 5100 XL notebook, AlphaSmart 2000 keyboard
114 Helix Software Hurricane 98, Traveling Software Point B Remote Net Accelerator
116 Panasonic LF-D101 DVD-RAM drive
117 Aztech PCI-128 Wave, Diamond Monster Sound PCI cards
118 Definitive Scenario; SPSS 8.0

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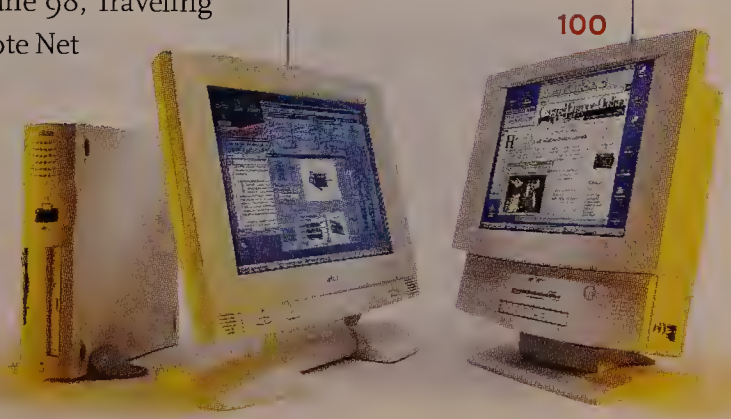
100

TOP 100

225 INTEL PCS GET CHEAPER
TOP 100 Price cuts on Pentium-II and other Intel-based processors result in some mouth-watering bargains on both power and budget charts. The tastiest could be Gateway 2000's $2349 corporate E-3110 PII-266, with its price cut by a whopping $540 this month.

online

228 POWER DESKTOPS
TOP 20 More than a third of all PCs on the power chart have dropped their prices by $200 or more, with good deals coming from large vendors like Gateway and smaller outfits like Acma and Unicent.

240 BUDGET DESKTOPS
TOP 20 Talk about cheap! Seven Intel-, AMD-, and Cyrix-based PCs on the budget chart now cost under $1500, and Gateway 2000's G6-233 debuts as the first Pentium II on the chart for less than $2000.

250 NOTEBOOKS
TOP 10 Bigger screens, better speakers, and bang-up performance gains are making notebooks viable as desktop alternatives. One prime example: Micron's multimedia powerhouse, the Transport XKE 233.

256 HOME PCS
TOP 10 Price cuts on current PCs, including $304 off a Micron Millennia, keep others from edging onto the chart.

259 PERSONAL PRINTERS
TOP 10 A retested Canon ink jet sneaks onto the chart with a new, lower price.

263 15-INCH MONITORS
TOP 10 CLR's new $249 Vision Pro 15 tops the chart with sharp text, realistic graphics, and one very low price.

265 GRAPHICS BOARDS
TOP 10 Emphasizing the need for good 3D, we revise our rankings and find the Hercules Stingray 128/3D back on the chart.

267 MODEMS
TOP 10 A Motorola 56-kbps modem that's bundled with voice mail and speakerphone shoots to number one.

HERE'S HOW

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Shut down your PC at night, change a group of file names with one command.

288 **WINDOWS TIPS**
Take this Shortcut through Network Neighborhood, close Windows 95 by remote control.

294 **SPREADSHEETS**
Differentiate blank cells and zeros, create dates for the twenty-first century.

296 **WORD PROCESSING**
Import and clean up text files, download free Word 97 templates and wizards.

300 **INTERNET TIPS**
Beware of responding to spam, save whole Web pages to your hard drive.

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How to troubleshoot your PC ports, clocking a '24X' CD-ROM drive.

308 **UPGRADE GUIDE**
Installing a graphics board, step-by-step.

@HOME

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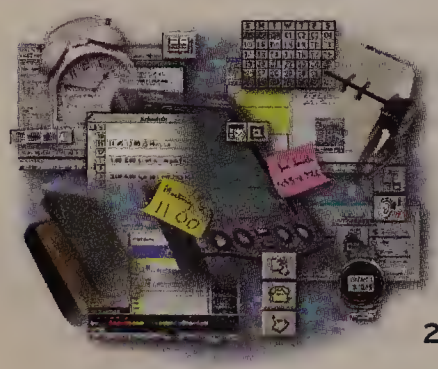
Get a life...or at least schedule it better with these software, hardware, and Web-based organizers.

274 **KEEPING UP**
Web sites and services for consumers.

276 **HOME OFFICE**
How formatting your hard drive will make Windows 95 run faster.



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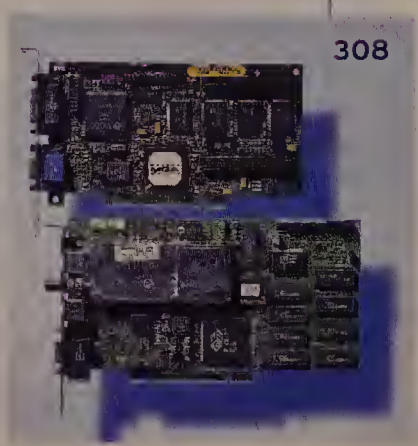

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31 **COMING UP**

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45 **PCW ADVOCATE** Software on your new PC may be stolen, watch out for not-so-free ISP trials.

49 **GOT A PROBLEM?** Upgrading to 56 kbps Internet access without hassles.

55 **BUGS AND FIXES** Pentium bug + Internet Explorer 4.0 flaw = disaster, plus bug fixes for Navigator and Riven.

278 **SWEEPSTAKES SURVEY** Tell us what you think—join our $10,000 sweepstakes.

344 **FULL DISCLOSURE** Give me manuals! I want manuals!

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- 3.5" floppy drive
- 100MB Iomega Zip drive
- 32 voice wavetable stereo sound with speakers & subwoofer
- US Robotics Sportster 56K x2 internal data/fax modem**
- Diamond Viper V330 AGP 128-bit 3D video with 4MB SGRAM
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- Zoomed Video capable
- Touchpad pointing device
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- 2-way Infrared port
- Modular floppy drive
- Microsoft Windows 95 and MS Plus! Companion
- Microsoft Office 97 Small Business Edition
- 5-year/1-year Micron limited warranty

$2,499

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**Circle 149 on reader service card

**Maximum transmission speed of up to 56Kbps when downloading data and 33.6Kbps when uploading. However, actual performance is dependent upon numerous factors and observed transfer rates may be less than the maximum potentials.

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No matter where you're headed, a Micron TransPort can handle the trip.

MMX™ intel inside pentium® PROCESSOR

Portable Solutions

Notable Portables. With 17 industry awards in 1997, the Micron™ TransPort® has made a name for itself as a true desktop performing portable PC. The TransPort XKE has been called "the all-around fastest notebook you can buy"* and the TransPort VLX "the best budget-bound notebook money can buy."** And because they're portable, you can depend on these dynamos everywhere your work or play may take you.

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We've got you covered. Behind every Micron PC is our award-winning team of customer service and technical support experts. And they *are* experts. In fact, readers of *Home PC* recently ranked Micron number one in overall reliability and technical support. You can call Micron toll-free anytime, day or night, for the industry's best technical support to always keep your Micron PC up and running.

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166MHz Intel Pentium® processor with MMX™ technology
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1.6GB hard drive
16X modular CD-ROM drive
Li-Ion battery
12.1" TFT SVGA, 800x600 display
256KB L2 pipeline burst cache
PCI bus with 128-bit graphics accelerator
MPEG compatible
Zoomed video-ready
Touchpad pointing device
Microphone and 16-bit stereo sound
2-way infrared port
Modular floppy drive
Microsoft® Windows® 95 and MS® Plus!
5-year/1-year Micron limited warranty

$2,249
Bus. Lease $79/mo.

TRANSPORT XKE

STANDARD FEATURES
512KB pipeline burst cache
128-bit, 2MB DRAM graphics
20X modular CD-ROM drive with AutoPlay™ technology
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Integrated 33.6 Kbps modem, full duplex
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2 infrared ports, S-Video, NTSC, game, USB port
Mobile Software Solutions
2 modular expansion bays
Custom nylon carrying case
Microsoft Windows 95 and MS Plus!
Microsoft Office 97 Small Business Edition
5-year/1-year Micron limited warranty

TRANSPORT XKE 200

200MHz Intel Pentium processor with MMX technology
64MB EDO RAM
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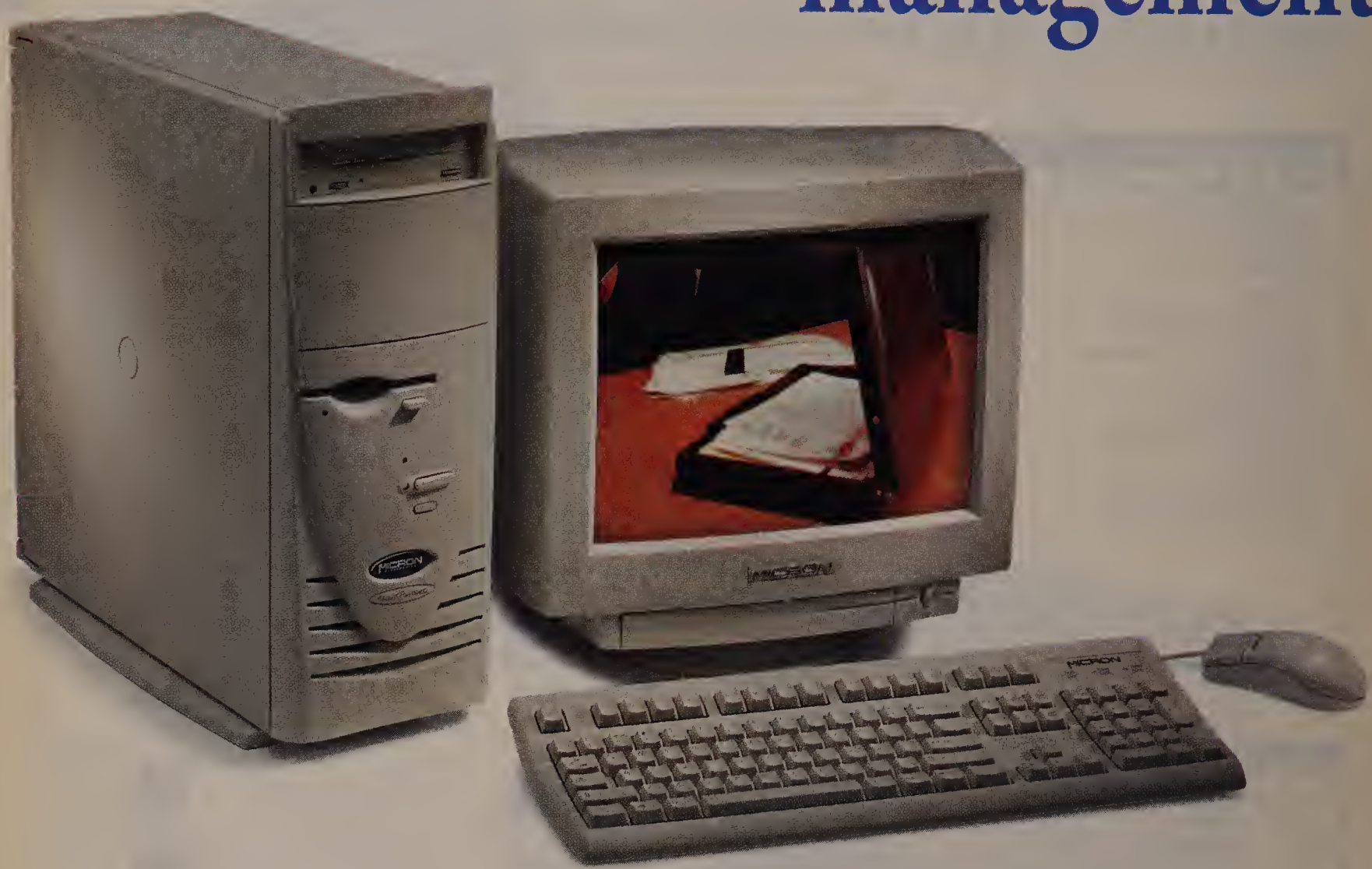

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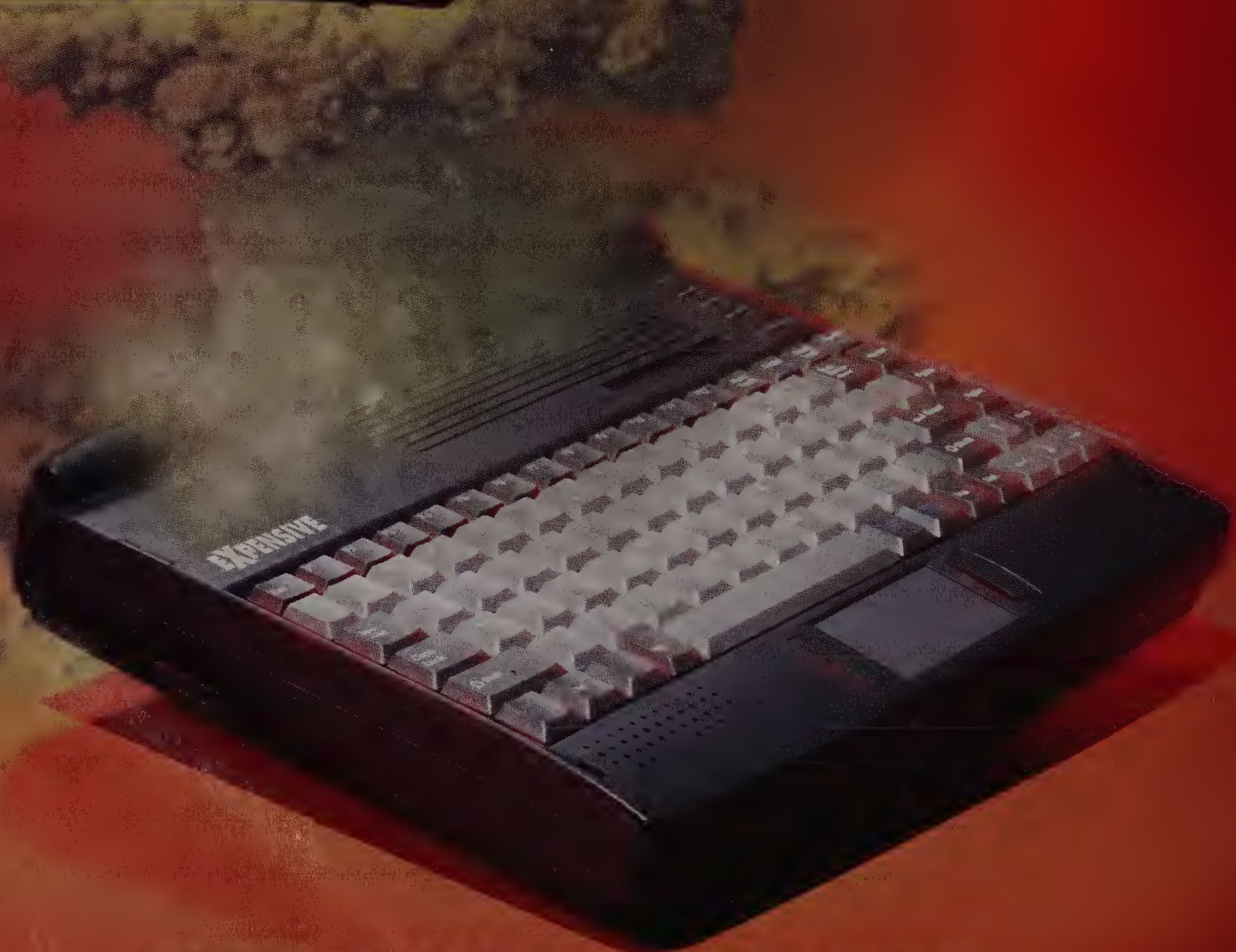

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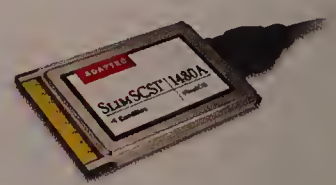
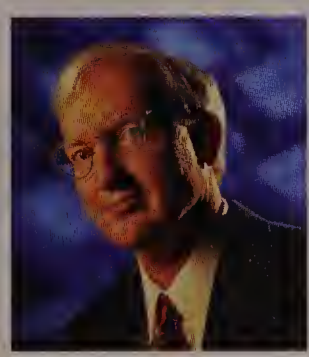


The Browser War: Justice and Microsoft

AS MR. BUMBLE SAID in *Oliver Twist,* "The law is a ass." What he meant is that the law focuses entirely on precedent, which is an ancient, pathetic stand-in for the glorious modern phrase *backward compatibility.* In the English-speaking world, the law tries to be backward compatible all the way to the Magna Carta in 1215. Software values new technology more than backward compatibility.

Windows 95 strove to be backward compatible with Windows 3.1 (launched a mere three years earlier) yet achieved mixed results. Is it any wonder that the lawyers at the Department of Justice disagree with Microsoft about the meaning of language in a consent decree approved by both in 1995? Or that Microsoft, for whom the notion of restraint is anathema, bridles under a temporary restraining order?

The order buys time for the court to examine the main issue: whether integration, in this case, is nine-tenths of the law. The decree says that "Microsoft shall not enter into any license agreement in which the terms of that agreement are expressly or impliedly conditioned upon: (1) the licensing of any other covered product, operating system software product or other product..." The Justice Department believes that this language prohibits the "tying" of other products to the monopoly product, Windows.



Will Windows 2002 include the Microsoft Health Plan, Funeral Service, Broker, Teller, Phone, Toys, and Meals?

THE LANGUAGE TAKES AWAY, THEN GIVES

HOWEVER, THE LANGUAGE of the decree goes on immediately thereafter as follows: "...(provided, however, that this provision in and of itself shall not be construed to prohibit Microsoft from developing integrated products)." Microsoft contends that the phrase "integrated products" reserves the right to incorporate any software whatsoever into Windows. The Justice Department apparently believed that the phrase gave Microsoft only the right to incorporate additional features that fall within the definition of "operating system" stated in the agreement.

Let's suppose Microsoft's interpretation prevails. Then we can look forward to Windows 2002 and its host of new integrated features: the Microsoft National Bank Virtual Teller, for all your banking needs; the Microsoft Mint, which prints bills backed by the full faith and credit of Bill; the Microsoft Broker, for direct purchase of stocks and bonds; the Microsoft Cutlass airline reservation system; the Microsoft Taxation System, routing payments from you to the government; the Microsoft Phone Booth, for local and long-distance service; Microsoft Wheels, for buying cars; Microsoft Meals, for ordering groceries; Toys 'R' Microsoft; the Microsoft Enhanced Wastebasket, for your waste disposal needs, including diaper service; the Microsoft Health Plan, for medical care; and, finally, Microsoft Will Bury You, a funeral service in case the Health Plan makes a fatal error. All of the above are inseparable features of the operating system, which is bundled with every new PC and retails for $99. The Microsoft Mint pays for the purchase by printing the money needed. Critics will harp on Microsoft's failure to finish the Microsoft Gene Generator and the Microsoft Inseminator Mouse in time for Windows 2002. Conception-to-grave functionality must wait until Windows 2004.

DOES THE BROWSER BELONG?

REGARDLESS OF WHEN or why Microsoft decided to integrate the Internet Explorer browser in Windows, does it make sense? Browsers perform a general function: They let us view documents. Users might prefer to view all documents, whether on the Net or not, the same way. On the other hand, they might like a clear distinction between external and local documents. Because both preferences are plausible, the question of whether a browser belongs in the operating system is legitimate. Where the browser is concerned, Microsoft's argument has some merit.

The company's predatory pricing and threats to withhold Windows 95 from PC vendors seeking to bundle Netscape Navigator instead of IE revived the government's case. Whether or not Microsoft's threats were founded on a correct interpretation of "integrated products" in the consent decree, we are left to ponder the backward compatibility of current antitrust doctrine with the Sherman Act, which says, "Every person who shall monopolize, or attempt to monopolize...any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony." And what of the Clayton Act, which prohibits "tying" additional products to a monopoly product? These federal laws were created to preserve the possibility of competition. If the legal system has stripped them of meaning, then the law is something worse than an ass. It is like an operating system that claims to support all programs, yet allows only the biggest to run.

Phil Lemmons is editorial director of PC World. ■

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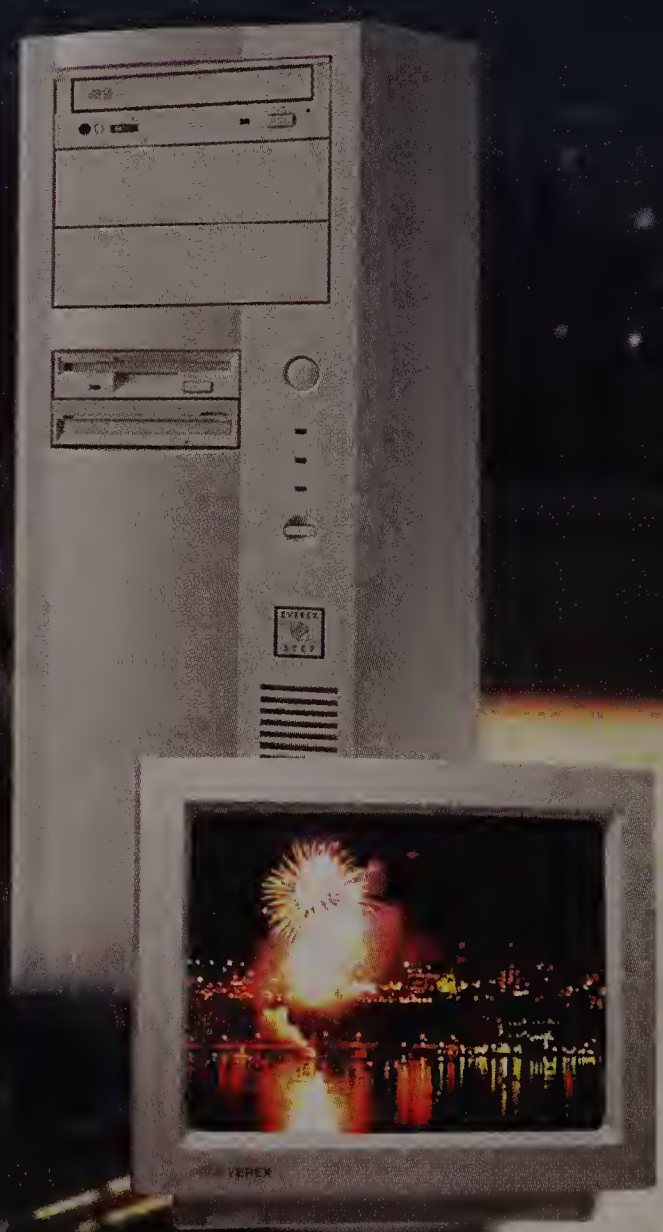

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YOUR TAKE ON: Leasing computers ◆ Is Microsoft like GM? ◆ 486 upgrades

HE DID THE MATH

YOUR ARTICLE "You Are Being Watched" [November] states that a "highly regarded systems administrator...made 15,000 visits to the same adult Web site in just one month." Huh? Let's see:

15,000 visits divided by 30 days = 500 visits per day.

500 visits divided by 10 working hours = 50 visits an hour.

Hmm. That's a visit every minute or so. How could he be highly regarded? He did not do anything except visit that Web site!

Larry Hillin, Houston

Editor's response: It does sound unbelievable. Still, our source—an EDS systems administrator—is "pretty sure" it was 15,000 visits but admits the number could include page views or hits. At any rate, he says the fired employee spent a "staggering" amount of time surfing porn sites. —James A. Martin

TO BUY OR LEASE?

THE ITEM "Rent-a-Computer" in *Keeping Up* [November] was intriguing. After reading it, I turned to a Dell ad on pages 378 and 379 ("Introducing Dell's personal lease which protects you against obsolescence"). I decided to do the math and see what the benefits are. Here's an example: An XPS D300 leased at $149 per month for 24 months costs $3576, or you can purchase the same PC for $3349. Then I checked the fine print: The price of the lease does not include the shipping fee, the tax, or a $55 fee for documentation.

I will admit that the taxes and shipping would apply to a purchase also, but the total monthly payments—which amount to $227 above the purchase price—coupled with the $55 fee are a little more than I want to spend for the privilege of protecting myself against obsolescence.

Charles Kimmel, Midland, Michigan

Editor's response: See next month's *Consumer Watch* for a discussion of the pros and cons of computer leasing. —Dan Tynan

LIMITED ANALOGY

RECENT LETTERS to *PC World* used an analogy comparing technology companies and car manufacturers—Microsoft and GM, for instance. But GM doesn't have to worry about its engines or transmissions being installed in a Ford, or installing a Toyota steering column in a Corvette. Microsoft, on the other hand, must deal with several processor companies, a dozen memory manufacturers, hundreds of board and peripherals firms, and thousands of software vendors, whose products people expect just to plug and play.

Once the PC 98 standard is implemented and the manufacturers get their acts together, these problems will disappear, and operating system and software ▶

HOT BUTTON

Is Internet Explorer 4.0 the Software From Hell?

REGARDING THE ARTICLE "Communicator vs. Internet Explorer: And the Winner Is..." by Yael Li-Ron [December]: Your dedication to Microsoft is laudable. You pick IE 4.0 as the winner, but you also constantly bring up instances where it falls short. You even complain about bugs that you admit Microsoft is not even considering fixing! Read the article again with an open mind, and you will realize that you make a much better case for Communicator.

Jerry W. Wilson II
Ft. Lauderdale, Florida

WHEN I FIRST installed IE 4.0 with the desktop integration, my Windows 95 PC crashed continually, so I uninstalled it. I later reinstalled the program without desktop integration. This seems to have solved most of the problems I encountered before.

Tom Keller, Internet

I LOVE IT. Your writer chooses IE 4.0 over Communicator—once they fix the bugs! Assuming they fix the bugs. Shame on you.

Jerry Bianchi
Lakewood, Colorado

NETSCAPE has delivered a browser that I would never consider "shaky." On the other hand, I have a whole list of friends whose systems have been wrecked by Internet Explorer 4.0.

John Pezza
Rio de Janeiro, Brazil

YOUR ARTICLE is a good comparison of IE 4.0 and Communicator, but it neglects to mention the Microsoft program's biggest shortcoming—its inability to run a lot of Java applets. The vast majority may claim that IE 4.0 is a better browser because of features such as desktop integration, but it clearly isn't better at its primary task: browsing the Web.

Charles Brooker, San Diego

NOT ONLY is IE 4.0 "invasive" with its Active Desktop, it is a resource nightmare. Performance on my machine with the desktop overlay (yes, it is just an overlay—your old desktop is still right beneath it) degraded by at least 20 percent. And in side-by-side tests on my machine, Netscape's browser loaded pages 10 to 25 percent faster than IE 4.0.

Jim Catteau, Groton, Connecticut

ADDING INTERNET Explorer 4.0 to your computer is a bit like adopting a tiger as a pet. It can be a wonderful companion after obedience training, but it may eat you in the process.

David Oliver, Internet

I DON'T HAVE time to constantly reboot my computer, run ScanDisk to fix the hard drive, or do other assorted tricks just to get the "wonderful" features of IE 4.0. When anyone asks me, I tell them that IE 4.0 is the Software From Hell.

Harmon O. Pritchard Jr.
Germantown, Maryland

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For complete rules and an alternate method of entry, check out our sweepstakes ad on page 278. Thanks for your help—and good luck!

designers can spend more time optimizing code and making things easier to use rather than fighting over incompatibilities.

Joshua Hartke, Dieterich, Illinois

IT TAKES TRAINING

IN NOVEMBER *Letters,* David Carr complains about his IS help desk but blames Windows. Sounds like his people need training. Some training is required to keep anything working. Put the blame where it belongs.

Judy Vajgrt, Mobile, Alabama

YOU CAN UPGRADE YOUR 486

YOUR ARTICLE "Can't-Miss Upgrades" [November] was great except for telling 486 owners to scrap their machines. A 486 dreams of being a Pentium, and with a good case, hard disk, floppy drive, and so on, a 486 can become a Pentium for a lot less than a new machine costs.

For $400 by mail order, I got a Pentium-based motherboard from Biostar, a Trident PCI graphics card with 1MB of video RAM, 16MB of EDO system RAM, and the Cyrix 6x86 P120 processor. I put the system together myself. It works great—my old dray horse races like a thoroughbred.

Fred Mehlos, Santa Rosa Beach, Florida

NO APPS, NO OS

CLYDE STAUFFER [*Letters,* November] made a valid point about the coverage of Windows 95 versus other operating systems. But without applications, an OS ▶

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is worthless to those of us who want to use our PCs from day one. The vast majority of new systems come with Windows because it is the only viable OS for the average user: easy to use, well supported, lots of apps. Most home and small-business users don't want to hear about other operating systems—that information is of no practical use to them. The magazines don't cover those operating systems because they know their readers well.

Rollie Reid, Internet

THAT WINDOWS 95 KEY

THE WINDOWS 95 key on my keyboard is fast becoming an annoyance. Inadvertently pressing it while trying to hit a combination that includes <Ctrl> or <Alt> has often wreaked havoc on an operation I'm trying to perform or a program I'm attempting to use. I wish someone would put a disable toggle on the bottom of the keyboard or something, so that hitting this key would not crash my DOS programs or close all the windows. It's driving me nuts. I don't know how to complain to all the keyboard manufacturers in the world, but I'm sure that you do, so please advise them of this ridiculous drawback.

Michael Ong, Provo, Utah

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.* ■

CORRECTIONS AND CLARIFICATIONS

IN "COMMUNICATOR vs. Internet Explorer: And the Winner Is..." (December), we said that Communicator's Messenger e-mail program makes users type in their password each time they open it. As a number of readers pointed out, you can tell Messenger to remember your password: Select *Edit•Preferences•Mail & Groups•More Options*, and then check the *Remember my mail password* box.

In December's *Top of the News* preview of Windows NT 5.0, the "NT Closes In on Windows 98" comparison inaccurately stated that the NT Task Manager's CPU and memory usage monitors were new for version 5.0. In fact, these features already exist in Windows NT 4.0.

PC World regrets the errors.

COMING UP IN MARCH

CURE WINDOWS HEADACHES

Face it: Aren't there things about Windows 95 that are just a pain? Here's the cure for what ails you. Whether it's mastering the Control Panel or managing Windows Explorer like a pro, we'll share tips and secrets and throw in advice for Windows 3.1, NT, and 98.

WEB SEARCHING SECRETS

The Internet can be so overwhelming that only the Web-sawviest can get to information quickly. Here's how to find what you need fast, with step-by-step shortcuts and the best search sites.

VIRUS WARS

New macro viruses are just some of the scores of insidious programs waging war on PCs every week. We pick one of eight antivirus packages as our recommended weapon to take into battle.

FLOPPIES ON STEROIDS

Want to add to your hard drive, lock up data, or shuttle files between home and office? We test 14 removable-storage options with capacities up to 1.5GB and find some speedy large-capacity picks.

ALSO NEXT MONTH

▶**PC World's Top 100:** The top power desktops, budget desktops, notebooks, and home PCs, plus the top printers, monitors, graphics boards, and modems.

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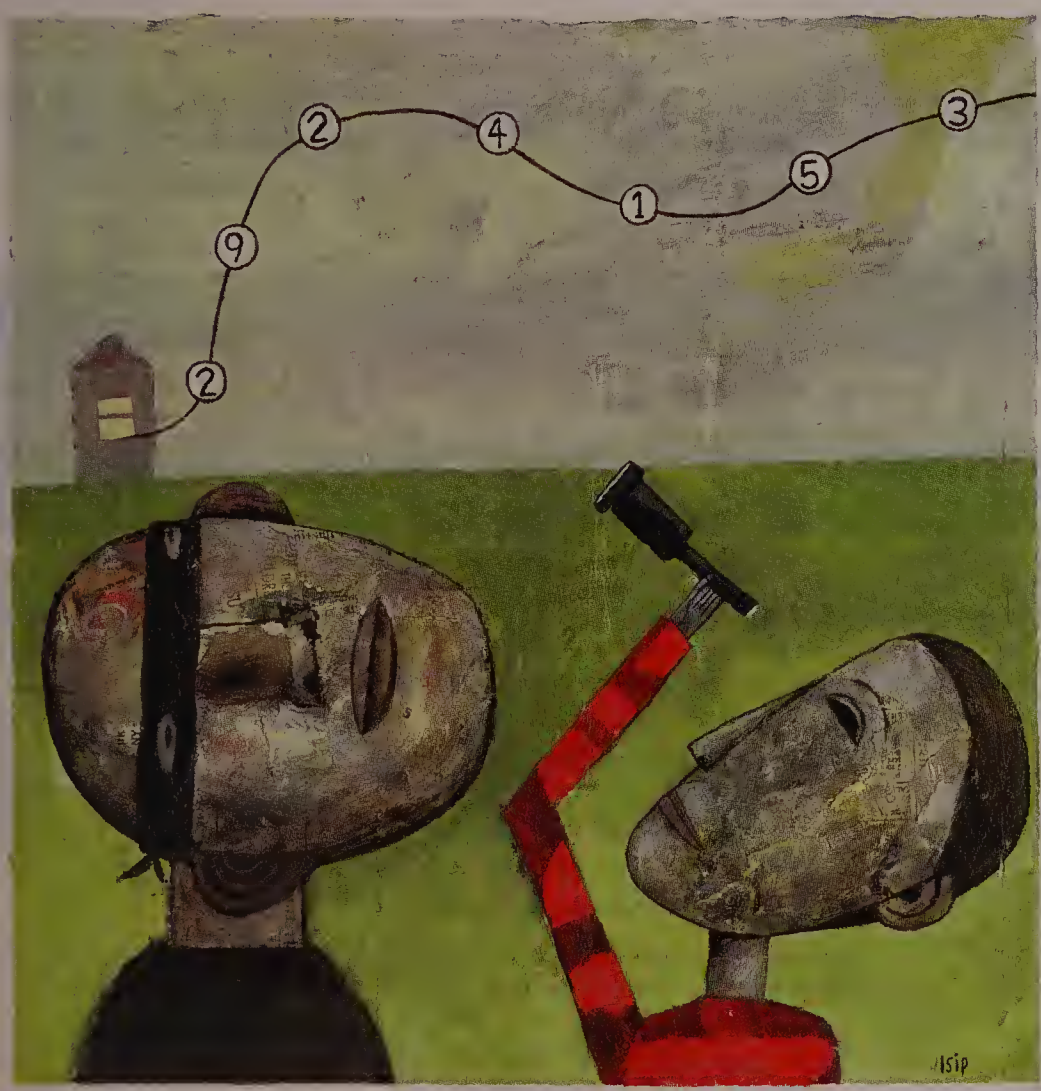

MY NEIGHBOR JOE IS AN Internet junkie. He's developed a Web site for his family, and he turns to the Net to research everything—from which shower doors to purchase for his newly renovated bathroom to how to care for the two bearded dragon fish his children convinced him to buy as pets. But Joe doesn't use his credit card to order merchandise online.

"It's just too risky," he tells me. "You never know who's going to get their hands on that information." It's a sentiment echoed by most Internet users today. Despite its seemingly winning convenience, online shopping remains confined to a small portion of Web-savvy consumers.

So Joe isn't alone. In fact, according to a 1997 study by New York City–based market research firm Find/SVP, only 27 percent of regular Internet users had shopped online in the previous 12 months. And although Find/SVP didn't ask respondents why they weren't shopping, a separate study by Visa USA revealed that 91 percent of consumers were "concerned about the level of security on the Internet." Even if the numbers are slightly inflated, we're still looking at a significant percentage of the population that's not comfortable with Internet security.

PC hardware and software top the list of products purchased online, according to Find/SVP, and Dell Computer is one company that has cashed in on the trend in a big way. In the third quarter of 1997, Dell's online sales to consumers and small-business owners were averaging $3 million per day, says company spokesperson Bill Robbins. "It's just as safe, if not safer, to submit something over the Internet than it is to give your credit card to a waiter at a restaurant," Robbins argues.

But even Dell's PC-literate consumers don't always agree. Only one-third of the company's online customers pay by sending their credit information across the Net. The vast majority configure and select their Dell PC online, then give their credit card number over the phone.

"This is a technology transition," concedes Robbins. "When ATMs came on the market, many people were comfortable taking money out of them, but not with depositing funds that way. Now consumers are very comfortable with [conducting all their banking transactions] using an ATM." Over time, consumers will have that same level of comfort when it comes to shopping online, he adds.

None of the many people interviewed for this column could cite a recent incident in which a credit card number had been stolen in a Net transaction. Still, stories of such occurrences circulate like urban legends, frightening consumers in the process, says Cliff Condon, senior analyst with Forrester Research in Cambridge, Massachusetts. "It's like those stories about Mikey, the Life cereal kid, drinking Pepsi and eating Pop Rocks and his head exploding," Condon says. No one can prove it happened, but it takes on the significance of truth regardless.

Certainly, stories in the media contribute to consumers' paranoia. Although instances of ▶

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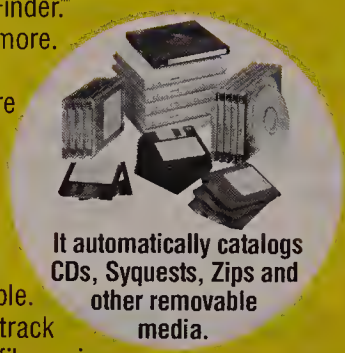
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ONLINE CREDIT SMARTS

- Buy only from companies whose name and reputation you know and that include their physical address and a phone number on their Web site.
- Look for the telltale locked padlock icon at the bottom of the screen. This indicates that the merchant uses Secure Sockets Layer technology to encrypt sensitive information. An unlocked padlock indicates that SSL is *not* enabled.
- Always keep a printed record of your transactions. Print out the page with the order information before you click the Submit button.
- Ask for a delivery date by e-mail or phone, and contact the company immediately if the order doesn't arrive on time.
- Cancel your order if you feel so compelled—and then notify your credit card company that you've done so.

Internet-based credit card fraud are rare, the mention of any type of security breach on the Web adds to consumers' overall distrust. Consider last summer's furor over a software glitch at credit reporting giant Experian: When consumers on a new Internet-based service requested their credit reports, the information was misdirected to the wrong customers. If it can happen with credit reports, why not with credit card numbers?

That's a legitimate question—and one that banks, card issuers, and online merchants have yet to answer satisfactorily. Indeed, some merchants just contribute to the confusion.

Online bookstore Amazon.com, for example, gives its customers three different ways to pay for their purchases, each with varying degrees of security. If you choose to order through the company's secure server, you'll see this statement: '[The secure server] encrypts information, ensuring that Internet transactions stay private and protected. Your name, address, and credit card number—plus everything else about your order—can't be read by anyone else as the information travels from your computer to ours. And once it reaches us, your credit card number is locked away in a computer ▶

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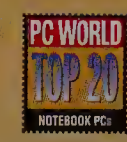

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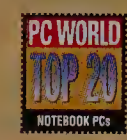

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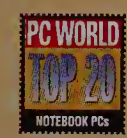

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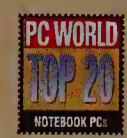

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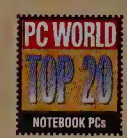

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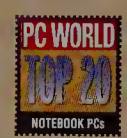

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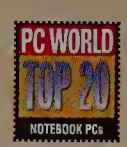

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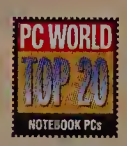

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Circle 242 on reader service card

that has no connection to the Internet'.

Sounds pretty safe, right? But what happens if you're unable to complete your transaction using the secure server? Logic would say that any other option would be less than secure, but not Amazon, which directs you to then use the "standard server," with this explanation: 'If you received an error message, you may have run into a firewall. Don't worry. You can still place your order online. We'll use our standard server to process it. It's entirely safe to enter your order, including your credit card number. It just won't be encrypted'.

I doubt that most consumers (who typically know little about firewalls and encryption techniques) will be comforted by Amazon's explanation of their options. Perhaps that's why Amazon, like many other online merchants, gives customers the option to place orders over the phone.

SOCKET SCIENCE

AMAZON, DELL, AND most other major Internet merchants use Secure Sockets Layer technology to encrypt customers' names, addresses, and credit card numbers. Microsoft Internet Explorer 2.1 or later and Netscape Navigator 2.0 or later both support SSL. (Depending on your browser, sites that use SSL are denoted by either an unbroken lock or a key icon at the bottom of the screen.) Although Internet security experts generally consider SSL a secure technology, consumers clearly don't share that confidence.

Along with MasterCard and American Express, Visa is hoping to take consumer confidence to the next level with the rollout of Secure Electronic Transactions. Using digital "certificates," SET will provide merchants and credit card issuers with a way of authenticating credit information used in online transactions.

Here's how it will work: When consumers click the Pay button at an online site, they'll be informed that they're about to perform a SET. They'll then select the credit card they want to use—each type of which will be represented graphically in an on-screen "wallet" that resides on the hard drive of the consumer's PC. Once the payment type is selected, the order information will go to the merchant, but ▶

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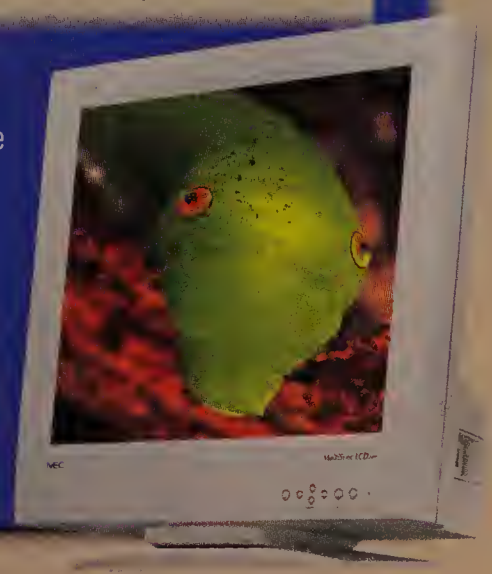
Viewable Image Size	14.1"	14.1"	20.1"
Maximum Resolution	1024 x 768	1024 x 768	1280 x 1024
Weight	11.0 lbs.	11.5 lbs.	22.0 lbs.
Dimensions (wxhxd)	14.1" x 14.2" x 6.6"	14.1" x 14.3" x 6.7"	19.7" x 19" x 8.7"
Brightness	200 cd/m²	180 cd/m²	150 cd/m²
160° XtraView Technology	no	yes	yes

For a little bit extra, the 14" MultiSync LCD400™ includes XtraView™ technology, which expands the viewing angle to an unprecedented 160°. And for those who believe that bigger is better, there's the MultiSync LCD2000™, the world's first commercially available 20" LCD monitor, also with XtraView. All of our monitors are misers. They take up at least 60% less space and consume at least 50% less energy than traditional CRT models. And all of our LCD panels are made by us—so we can make sure that the broadest line in the business is also the best. To find out more, call 1-800-NEC-INFO or visit www.nec.com. For more on XtraView technology, visit www.xtraview.com. Expect more. Experience more.



PC Computing — MultiSync LCD2000
PC Computing — MultiSync LCD400
BEST — MultiSync LCD400
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Circle 163 on reader service card

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the credit card data will go to the participating financial institution for verification. There's no typing in information, no worries about credit card info falling into the wrong hands. The numbers are kept in that encrypted "wallet" on the hard drive.

But right now the technology is still in the pilot stage. Visa spokesperson Greg Jones expects that it will take at least another year before the number of merchants and financial institutions using SET reaches critical mass.

In the end, some experts believe that SET may be more valuable to credit card issuers than to consumers. "By bank rules, consumers are liable for a maximum of $50 and the credit card issuers for the rest when credit cards are lost or stolen," says Forrester's Condon. "Because SET enables them to authenticate the holder, credit card issuers are hoping the number of fraudulent transactions will drop—and so will their liability."

SET READY TO GO?

IF SET ISN'T the answer, what will convince consumers that shopping online is safe? The simple proliferation of sites for known and respected national merchants helps boost consumer confidence. "In the physical world, you can look into the merchants' eyes and know they're real," notes Condon. "In cyberspace you don't have that luxury. We need a way to have that comfort with one another."

But until payment methods and security measures online become standardized—much as they are in the retail and mail-order industries—we're not likely to see the surge of online shoppers that Web merchants so desperately want. Let's face it: Would *you* order something online if you had any lingering doubts about your credit card number being electronically hijacked? If the behavior of the vast majority of online shoppers is any indication so far, the answer is a loud no.

How do you feel about shopping online? Send e-mail to consumerwatch@pcworld.com. Roberta Furger is a contributing editor for PC World. *Her first book,* Does Jane Compute? *has just been published by Warner Books.* ■

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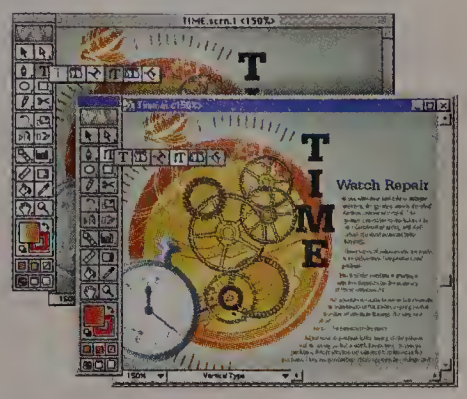

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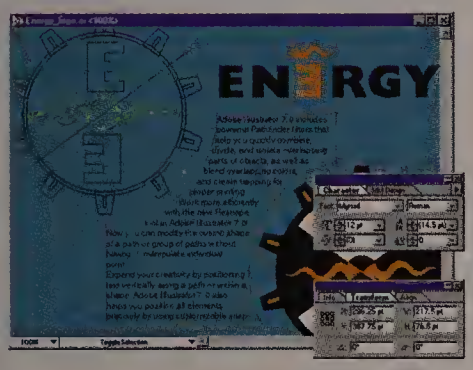

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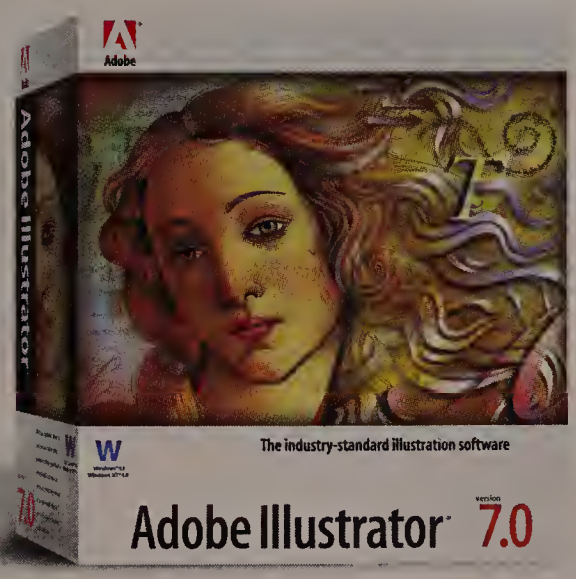

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LG Electronics

Maximus's shady software license ◆ Auction PC dies ◆ Beware cold calls

Software That Fell off a Truck

JOE FAUST OF Elkart, Texas, wrote to ask what was up with his brand-new copy of Corel's WordPerfect Suite 8. It came with his Maximus PC but lacked a serial number, so he couldn't register it. That smelled fishy to me, so I called Corel. Kevin McNeil, director of OEM sales, and the company's legal department got right on the case.

It turned out that Faust's copy of WordPerfect was gray-market software. This is software that, well, let's just say it probably fell off a truck. "More often than not, the software has been stolen," explains McNeil. It isn't counterfeit; Corel manufactured it, but the company didn't sell it to Maximus.

The bottom line is that Maximus obtained gray-market software instead of purchasing the software directly from Corel. Raoul Ventenilla, customer service manager at Maximus, told me that selling gray-market software with their computers is not a regular practice. "This was a mistake," Ventenilla says of the Faust incident.

According to Heather McDonald in Corel's legal department, "The problem of gray-market software in North America is rampant." So readers, be careful. The first sign you are dealing with gray-market software is if the price is too good to be true ($29 for this suite, for instance); you may be getting stolen goods with no serial number and no support. If you smell a rat, call the software publisher and see if the PC manufacturer is one of its customers.

ILLUSTRATION: HAL MAYFORTH

GOING ONCE, TWICE...?

SEVERAL READERS WROTE with tales of trouble about Auction PC, an online auction site. Products weren't arriving, and the company wasn't responding to complaints. I had trouble reaching Auction PC myself, even though the Web site appeared to be operational. But I finally reached Fred Morgart, Auction PC's former purchaser, who told me that things aren't as sinister as they seem. "One of the employees embezzled large sums of money and that pretty much closed us down," he explained. Morgart said he'd hired someone to answer the phone and handle returns and customer service inquiries. A new customer service number was working at press time: 973/686-1571.

NOT-SO-FREE TRIALS

STEVE TIDWELL OF Hillsboro, Oregon, recently switched to GTE Internet as his Internet service provider. It was easy. His wife got a call from GTE offering a free trial, and since she knew he had been considering GTE, she told the sales rep to send the software. It sat unopened, but Tidwell's phone bill contained charges for the Internet service that he hadn't used. It turns out the free trial started when his wife said yes, not when he signed up online. Bill Kula, a spokesperson for GTE Internet, assured me that GTE was not calling people at random, and said it should have been made clear that billing would start immediately. GTE has refunded Tidwell's money.

SORRY, SOLD OUT

MIKE WALKER OF Nashville, Tennessee, was annoyed when he tried to order a hard drive he saw advertised in *PC World*. Liking the $99 price, he called CompUSA Direct but was told the drive was no longer available. The only comparable product the rep could offer cost twice as much. Carol Elfstrom, director of public communications, admits CompUSA ran out of the $99 drive before the ad in *PC World* even hit the streets. "We tried to get more inventory," explains Elfstrom, "but we just couldn't." CompUSA has since contacted Walker and found a drive at a price that met his needs.

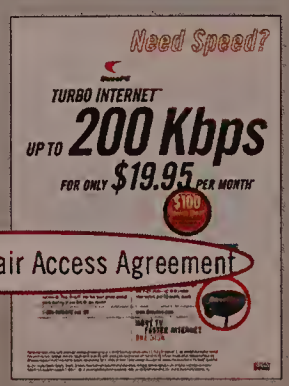
Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for* PC World. ■

THE FINE PRINT

FAIR ACCESS AGREEMENT? WHAT'S THAT?

THE FINE PRINT ON this advertisement for DirecPC's satellite Internet connection holds these mysterious words: "All Turbo Internet packages...subject to Fair Access Agreement." Huh? It's not explained anywhere in the ad, but essentially this means you have to agree not to hog system resources when you sign up for the service.

According to Dave Zatloukal, assistant vice president of DirecPC services, the Internet service provider had trouble with people using it to run their own ISP or continually download huge amounts of data. Thus the company launched the Fair Access Agreement, which went into effect last summer. DirecPC monitors your activity with an eye on the average amount of data you download. If your average gets "hoggish" (say you're grabbing 500MB files all day, every day), your service slows down without any warning. You can read the agreement at www.direcpc.com.



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Circle 143 on reader service card

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What to Do When 56K Is Not OK

If you're like Dale Voykin, you know that upgrading your modem to 56 kbps is anything but easy.

PROBLEM *Software-based modem upgrades are not always successful, and new 56-kbps modems are often slower than expected.*

SOLUTION *Take precautions before downloading software upgrades, and make sure your PC and phone line can handle 56 kbps.*

THE REASON FOR UPGRADING your old modem to a 56-kilobits-per-second technology, or for buying a new 56-kbps modem, is to take advantage of faster connections. But for Dale Voykin and others, switching to 56 kbps has been anything but speedy.

Voykin, a hydrogeologist for an Atlanta engineering firm, bought a U.S. Robotics Sportster 28.8-kbps modem in summer of 1997. On August 13, he went to the 3Com/U.S. Robotics Web site (the companies merged in June) to get the software required to boost his modem to x2, USR's 56-kbps technology.

Voykin paid the $60 upgrade fee with his credit card, but during the download process, his connection mysteriously failed. He started over, successfully downloaded the software, and then installed it. But when he clicked on the modem icon in Windows 95's Control Panel, he discovered that the modem had not been updated at all. Voykin made numerous calls to 3Com attempting to resolve the problem, but no luck. Eventually, the company sent him a brand-new 56-kbps Sportster modem. It worked—but Voykin says he still can't get a connection speed higher than 28.8 kbps. What's the solution?

AVOID THE DOWNSIDE OF UPGRADING

JACKING A 28.8- OR 33.6-KBPS modem up to 56 kbps often involves downloading a software upgrade from the modem vendor's Web site (provided the modem has a RAM-based digital signal processor). This process has a number of possible pitfalls.

In Voykin's case, his initial connection problems may have been caused by an overwhelmed network server, a bad phone line, or another factor, says Jim Thomsen, a software product manager for 3Com/U.S. Robotics. Pinpointing the reason that the downloaded software failed to upgrade Voykin's modem is even trickier. One possible explanation, according to Dean Brady, senior product manager for Sportster 56K modems at 3Com: "There may have been a day or two when we had a version of our upgrade software on the Web that had a bug in it."

Bugs or not, you can take precautions to make downloading smoother. For starters, Thomsen says, deactivate call waiting, as an incoming call can interrupt the connection. In Windows 95, select *Start•Settings•Control Panel*, select *Modems*, and click the *Dialing Properties* button. Check the box next to 'This location has call waiting', then from the drop-down list, select the code that disables call waiting in your area (usually *70).

Thomsen also recommends downloading during off-peak hours. When a network is overloaded, connections can be lost. In general the most congested traffic period is weekdays, from 5 p.m. to midnight, Eastern Standard Time. If you lose a connection after you've typed in your credit card number, don't reenter it—you'll ▶

PHOTOGRAPH: ANN STATES

only create duplicate charges. Instead, Thomsen advises, contact the modem vendor's customer support for help.

BYPASSING ROADBLOCKS

AFTER HOOKING UP a 56-kbps modem or upgrade, you'd expect some speed increases, even if 56-kbps modems rarely exceed 45 kbps. But potential roadblocks stand between you and higher speeds.

Your PC, for instance. The serial ports in most pre-Pentium PCs (and even early Pentium models) can't support speeds higher than 38.4 kbps. To achieve higher rates, the serial port needs a 16550 UART chip, which can support speeds up to 115 kbps. If you have an older PC, you'll need either a new UART chip for the motherboard, or a new serial interface card.

In some cases, a 56-kbps modem may be running at slower speeds because an incorrect .inf file is installed on the PC, says Thomsen. An .inf file helps your PC identify what features your modem has. "If the wrong .inf file has been installed, you might not be able to take advantage of all your modem's features—such as the 56-kbps speeds." To ensure that the proper .inf file is installed, go into Windows 95's Control Panel and double-click *Modems*. The device should be listed as 56-kbps compatible. If it's not, run the installation wizard again and point it toward the correct file (usually located on the floppy disc or CD-ROM that shipped with the modem).

Phone lines can cause modem slowdowns as well. Older lines, for instance, typically can't keep up with the faster speeds built into newer lines, Thomsen says. How do you tell if your phone line is 56-kbps capable? Using a standard communications application like Windows HyperTerminal, dial in to 3Com's test line (888/877-9248) and type **line test**.

The distance your data must travel can also affect throughput, Thomsen adds. "If your data has to travel through more than one digital-to-analog conversion point on the phone system, chances are you won't make a 56-kbps connection." To minimize connection points, ask your Internet service provider if the access number you're using is the closest one to your location.

In Voykin's case, the solution to getting 56-kbps speed probably lies in the new switching station the phone company is building near his home. "Currently my calls have to travel around a mountain, and they go through several conversion points before getting to my ISP," he says.

For a review of recent 56-kbps units and more modem buying advice, see "Route 56K: Fast Modems, but Watch for Speed Bumps," November, or find the article online at www.pcworld.com.

If you're having trouble resolving a PC-related hardware or software problem, we'd like to hear about it. See page 14 for contact information. James A. Martin is a PC World *contributing editor.* ■

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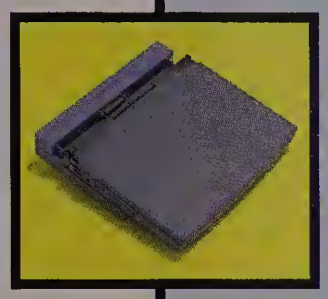

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Circle 3 on reader service card

IE 4.01 (whew!) ◆ Navigator Java jitters ◆ Riven to tears ◆ WordPerfect Suite 8 SP3

Pentium Bug, Meet the IE 4.0 Flaw

NEWS OF A SYSTEM-FREEZING Pentium error in early November overshadowed discovery of a new security hole in Microsoft Internet Explorer 4.0. Separately, neither bug is likely to bite you. But put them together, throw in a little evil wizardry, and you could have widespread mischief.

First, the Pentium problem: It turns out that you can put your Pentium or PMMX processor in a coma by using a simple 4-byte instruction. The problem can be triggered under any operating system if you create the specific illegal instruction. Intel quickly acknowledged the F00F error (named after the instruction's first two bytes) but noted that forestalling lockups requires a patch for each operating system. As we went to press, the patches were available for several versions of UNIX, though not for Windows.

Meanwhile, Microsoft acknowledged that if you type a res:// URL (a Microsoft-devised kind) longer than 256 characters in Internet Explorer 4.0, the browser will crash. No big deal, except that anything after the 256th character can be executed on the computer. This maneuver, known as a *buffer overrun*, is just about the oldest hacker trick in the book. Tack some malicious code (say, an executable version of the Pentium-crashing F00F code) onto the end of the URL, and you have the makings of a disaster.

Will it ever happen? Probably not. Could it? Sure. The only way to be certain it doesn't is to download Microsoft's IE 4.0 buffer-overrun patch (www.microsoft.com/ie/security/?/ie/security/buffer.htm). The fix is included in the IE 4.01 update, which also fixes the installation nightmares and security holes reported last month. (To download the update, select *Favorites•Software Updates•Microsoft Internet Explorer* in IE 4.0.)

NAVIGATOR 4.04 CURES JAVA JITTERS

BUG You've dutifully updated your copy of Netscape Communicator 4.0 through versions 4.01, 4.01a, 4.02, and 4.03—about 100MB of downloads. But when you click a link to a Web site containing Java, Navigator may freeze up solid.

FIX Communicator 4.04, as well as the stand-alone version of Navigator 4.04 (home.netscape.com/download), fix the Java problem. (To update, choose *Help•Software Updates* in your current version.) But Navigator experts report a nagging problem that still had Netscape stumped as we went to press. When you access bookmarks using Navigator 4.0x's toolbar, the program latches onto Windows system resources used to handle windows, files, fonts, and icons, then refuses to let go. The more memory you leak this way, the slower Windows runs. So far, Netscape engineers can't reproduce the bug consistently; they think it may be a conflict with drivers for the video board or other hardware. To avoid this performance-sapping memory leak, open Navigator's Bookmarks file using **<Ctrl>-B** instead.

BUGS DRIVEN FROM RIVEN

HAVE YOU FOUND that Riven, Brøderbund's long-awaited sequel to Myst, is a little too challenging? According to the company, QuickTime movies embedded in the game may play twice, or in the wrong location on screen, and you may not be able to click anything while they run. You could also have trouble operating rotating domes and turning on a light at the end of a tunnel. The company has released the 1.1MB Riven Updater 1.02 (www.broderbund.com/support/files/rivenupdater1.02.exe) that promises to stamp out these bugs.

Some Riven players report additional problems, including crashes when switching between the game's five CD-ROMs, choppy sound and video playback, and video clips that continue to play in the wrong place. A Brøderbund source says that most of these bugs stem from conflicts with older video drivers that aren't compatible with Microsoft's DirectX 5 graphics interface.

Files from this article are available on PC World Online (www.fileworld.com). Scott Spanbauer is a senior associate editor for PC World. ■

IN BRIEF

WordPerfect Suite 8 Service Pack 3

THIS 7MB PATCH (wp8sp3.exe) solves problems that the earlier SP1, SP2, and revision B updates missed (see ftp.corel.com/pub/wordperfect/wpwin/8). If you have the original version (8.0.0.153), you'll have to call Corel at 800/772-6735 to order the revision B upgrade first.

Dell Recalls Latitude AC Adapters

DELL ANNOUNCED in late October that hundreds of thousands of Latitude LM Port Replicator AC adapters have pins that can break off in the detachable power cord, posing a shock hazard. Defective adapter part numbers start with DP/N 00097689 and DP/N 00099500, and end with A00, A01, A02, and A03. To get an affected adapter replaced, call Dell at 800/715-1483.

BUGGED?

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ICON: JEFFREY PELO

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Circle 103 on reader service card

FUJITSU ACCESSORIES

Designed for Microsoft Windows 95

TOP OF THE NEWS

Telecom Reform

Where Are the Choices, Lower Prices?

The 1996 Telecommunications Act promised affordable phone and PC services—but monopolies and sluggish regulators have stalled progress. Will new technologies help?

ANALYSIS

THE PROMISES OF the Telecommunications Act of 1996—lower phone and data rates, new competitors offering innovative services, rapid implementation of new technologies such as high-speed Internet access—sounded good. But mention telecom reform a couple of years later, and consumers groan—for good reason: Most of them have yet to realize any savings.

PUSHING COMPETITION

TELECOM REFORM was supposed to create robust competition in all industry areas. Backers boldly claimed that the new law would open local phone and cable markets to competition, cut red tape so innovators could enter markets and develop products more easily, and broaden consumer access to advanced services. But censorship issues aside (the law's "decency" provisions did not survive the legal challenges), the telecom act left a big question: Would it actually lead to more choices and lower prices, or would it spawn monopolistic megacompanies that stall progress in an attempt to line their own pockets?

When it comes to a choice of vendors and lower connect rates, most of the act's promises are still just promises. A key requirement for change, the opening of local phone markets, seems as distant as ever: It's been stalled by the Regional Bell Operating Companies—Ameritech, Bell Atlantic, BellSouth, SBC Communications, and US West—the Baby Bells that provide most local phone service. They still tightly control ISDN and T1 rates and some Internet access technologies. Megacompanies—notably combinations of WorldCom and MCI, Bell Atlantic and Nynex, and SBC and Pacific Telesis—have arrived, preaching a gospel of competition among the behemoths. Only

EDITED BY
Charles Piller, Randy Ross, and Bill Snyder

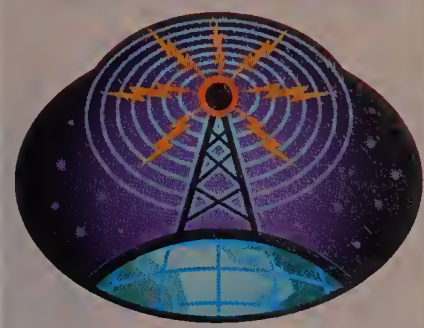
ILLUSTRATION: ROBERT NEUBECKER; ICONS: JEFFREY PELO

giant companies, they say, can fund research, upgrade the multibillion-dollar telecom infrastructure, and provide diverse services.

If they're right, will this year bring you any payoffs? Probably only modest ones—and even those will depend on how the Federal Communications Commission and its new chair, William Kennard, handle four key issues:

- The FCC must watch the megacompanies and carefully consider proposed new mergers to ensure that they foster competition.
- Two key court cases will directly affect reform—and your wallet. The first, on competitive access to the Bell networks, could dampen local phone competition. The second reexamines which companies should fund Net access for schools and libraries, and whether they can pass along the costs to rate payers.
- The FCC must tackle a federal-versus-states'-rights problem: State public utilities commissions have their own disparate regulations. And some Bell companies are trying to push more rule making on the states, where their local allies hold sway.
- The FCC must help regulate fast-moving telecom advances—such as Internet telephony and satellites—without slowing their progress. Such new technologies promise appealing phone and Internet access options that could force regulators to speed things up. Or technology innovators could do something radical: make today's telephone network less relevant. ▶

JUST IN



A 56-kbps Modem Standard

MAJOR 56-kilobits-per-second modem makers have agreed on specifications for a standard that would allow their products to interoperate. Right now there are two incompatible types of 56-kbps modems. Devices sporting the new standard, currently dubbed V.pcm, are expected by spring, according to analyst John Navas. He expects upgrades for existing 56-kbps modems by late summer. At that time, Internet service providers will likely be supporting the new standard, he says. If you're shopping for a new modem now, consider holding off for a product with V.pcm.

Microsoft Office: Web-Like Future

THE NEXT version of the Microsoft Office suite will use standard HTML as a native file format, making it dramatically simpler to create and edit complex documents for posting on an intranet or the Web, the company claims. With the upgrade, which we expect in about a year, you'll be able to fully view all Office documents with any HTML viewer, and documents will be completely editable by any Office user. Microsoft will continue to offer its proprietary file formats for customers who prefer those. ▶

INTERNET

GET UP-TO-THE-MINUTE NEWS, including RealAudio daily news summaries, hot game demos, the latest reviews, and productivity shareware, at PC World Online. Just point your browser to www.pcworld.com/news.

MERGER MANIA—GOOD OR BAD NEWS?

HOW HAS telecom reform done at its first big promise—increasing competition to attain lower prices and better services? We're stuck in the "ground rules" phase, says telecom analyst Brett Azuma of market research firm Dataquest. The telecom act was an unfinished blueprint: It left 80 or so separate issues for FCC rule makers to resolve.

The most noticeable change since 1996 is the merger craze, prompted by the law's relaxation of media-concentration guidelines. WorldCom's staggering $37 billion merger with MCI created the largest Internet service provider. Analysts estimate the new conglomerate owns at least half the Net's backbone, the huge pipe system through which all its traffic flows en route to smaller pipes into businesses and homes.

Megacompanies have good points, like one-stop billing and customer service and the resources to deliver bundled phone and Net services. "It's not what we had in mind in 1996, but that doesn't mean it's bad," says Jeffrey Kagan, president of research firm Kagan Telecom Associates. "Being a supercarrier is the only way they can really compete," by invading each other's territories with better services.

But there will still be room for small companies, Kagan says. In fact, a number of relative small fry offer discounted long-distance service, Internet access, virtual private intranets, and more, primarily to business customers in big cities.

GIANTS' RULES?

BUT MEGACOMPANIES have their downsides, as any user of Microsoft software knows: They often buy up small innovators before consumers see the rollicking competition. And they have great power to raise prices. Traditionally, owners of the Internet's backbone didn't charge fees. But now, heavy traffic causes slowdowns and reduces quality. So WorldCom and others are selling enhanced access to the fastest sections of the backbone, and ISPs must pay to play, passing along costs to

Feds' Top Telecom Regulator Pushes Competition

FCC chair William Kennard

PC WORLD ASKED NEW Federal Communications Commission chair William Kennard about his vision of telecom reform, and how he'll work to solve issues that are important to PC users.

PCW: What are your top priorities as you begin work?

WK: Competition is first and foremost. The principal mandate is to introduce competition in every telecom market in this country....My second top priority is to do that in a way that doesn't compromise important public interest goals, principally the goal of universal service, ensuring that all Americans benefit from the communications revolution. That means ensuring that people in rural America, where we have great challenges bringing the advanced broadband networks of today, realize these benefits, as well as people in impoverished inner-city communities.

PCW: What is the toughest job you face this year?

Telecom "Reform" Gets Poor Grades: Will 1998 Turn Tide?

The 1996 Telecommunications Act made big promises. Two years later, consumers see few tangible payoffs in phone or ISDN bills, or new choices of providers or services. But 1998 won't be a static year. Emerging technologies could speed progress or break open competition.

Key goals of the law	Progress grade	Where we stand	What's next
Build competition: Open local phone markets to competition, reducing connect rates and expanding choice of phone and Net access vendors.	D–	Bell companies and others stall by appealing FCC rules in court.	Congress is pressuring FCC to try new tacks; U.S. Supreme Court may take up a landmark competition case. But the payoff for consumers won't come this year.
Cut bureaucracy: Eliminate red tape for companies entering new markets and developing products.	C+	FCC has cut many regulations, but innovators—such as companies selling certain kinds of high-speed Net access—face complex state regulations.	In a few states, consumers will see new vendors and Net access options this year. The FCC must push for uniform rules between states.
Spread technology: Provide broader consumer access to advanced services, such as high-speed Internet access.	C	Without local competition, the goal remains largely unrealized. Local phone companies have been slow to roll out technologies that compete with ISDN.	Emerging technologies, such as Net telephony, satellite, and cellular, will make phone company pipes less important. The FCC encourages a "regulatory-free zone" for technologies that avoid today's phone network.
Enhance cable: Deregulate cable television to reduce rates and add new telephony and Net access services.	Incomplete	Cable TV rates have risen steadily. The cable industry is not driving overall competition as expected. Wiring for cable modems is incomplete.	No rate relief soon; cable TV rate deregulation starts in 1999. Companies like Microsoft are boosting the future of cable modems, but wide availability is years away.
Promote universal service: Make affordable, high-quality telecom services available nationwide, including in rural and inner-city areas.	C+	Some schools and libraries get new Net access funding; an upcoming appeals case challenges which companies will pay for it. Rural access issues are on hold.	Net funding appeals case begins in February; detailed discussion in Congress of how to ensure fair rates and access for rural residents is not expected until later this year.

PHOTOGRAPHS: KATHERINE LAMBERT; ILLUSTRATION: ROBERT NEUBECKER

WK: Making sure we can transition to a regulatory regime that promotes competition. There is a lot of competition in some markets. But there are still pockets of entrenched monopoly....It's vitally important that [ISPs] truly have free and unfettered access to the local telephone loop.

PCW: Are megamergers like the recent WorldCom-MCI deal good news for consumers?

WK: Some people have a tendency to say every merger is good or bad. That's the wrong approach. We have an obligation at the FCC to ensure that anytime a merger is presented to us...there are tangible pro-competitive benefits for American consumers.

PCW: Our readers want more high-speed Internet access options, but companies tell us that state public utilities commission regulations slow them down. Are state regulations too complex?

WK: The issue is beyond the complexity of the regulation. That's important too, but more important is ensuring that there are uniform pro-competitive standards...so you have the same opportunities to compete in Texas or South Carolina.

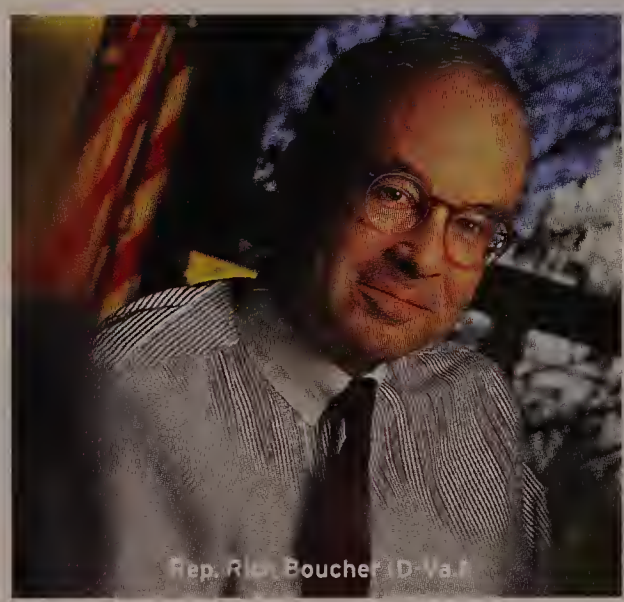
subscribers. And consumers who want access to the fastest pipes will have to pay extra, just as businesses already do.

CABLE: A NO-SHOW

MEANWHILE, the cable industry is crawling when it was expected to sprint. The telecom act eased the way for cable companies to sell Net access, but when they were confronted with the cost of upgrading thousands of neighborhoods for cable modems, most backed off. Dataquest estimates that of the 65 million U.S. homes with cable TV, only 200,000 had cable modems in 1997.

To recoup losses from bad investments and brace for the future, companies recently raised cable TV rates. For now, they'll add channels and offer services like pay-per-view. But this focus doesn't press telecom competition forward, leaving an unexpected void.

The most eagerly awaited outcome of the telecom act, competitive local phone markets, is the FCC's "top priority and biggest challenge," says Kennard. That's an understatement, given the two impending legal decisions and the emerging mess he faces pitting federal law against states' rights.



"Universal service is a noble goal. But you have to balance that goal with reasonable rates for consumers."

The 1996 act said that the Baby Bells could sell long distance outside their home turf right away, and within it once they opened local phone markets to competitors. They're stalling, fighting the FCC on everything from the definition of "open" to issues like home phone number portability.

BELLS FIGHT IN COURT

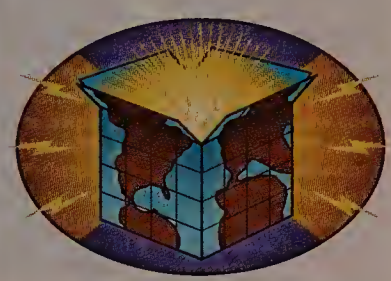
THE LAW GAVE the Bells rules for charging competitors that want to resell local phone service using Bell lines and equipment. The FCC ruled that the Bells should offer complete resale bundles and access to single pieces of their networks. The Bells fought, and in October 1997 the 8th Circuit U.S. Court of Appeals in St. Louis agreed, overturning the bundling regulations—a huge step backward, said the FCC.

Around the time you read this, the U.S. Supreme Court will likely decide whether to hear the case. If the ruling stands, the local competition could take longer to develop, and might deliver less to consumers than envisioned.

Such an outcome would be bad news for the many consumers who crave local phone options. Stan Coutant, a college professor from Sierra Madre, California, faces a common challenge: getting a straight answer to a simple question. He recently returned a customer survey from GTE, his local phone company, with a note asking about ISDN and when he could get it. He got back a form letter full of incomprehensible lingo. "I'd ▶

Call Waiting for Net Users

INTERNET CALL WAITING, a new service from Nortel (Northern Telecom), could make life easier for Internet users who have only one phone line. Here's how it works: If someone calls when you're logged on to the Net, a message pops up on your screen, says Gary Shechtman, a Nortel senior manager. You then have four options: Take the call, redirect it to voice mail, redirect it to another phone number, or play a recorded message. Nortel will market the technology to ISPs and phone companies, which in turn will offer it to consumers. Nortel expects the service to be available in the United States by the second quarter. Pricing was not available at press time.



Tidbytes

Higher-Performance Hotel Rooms: @Home Network and Fourth Communications Network plan to jointly roll out a 1.5-megabits-per-second Internet access service, dubbed @Hotel, to guests at selected hotels. Expect to see the service in 50 to 100 establishments around the country by year-end, according to Fourth Communications Network's Scott Harmon. **Toshiba Exits Consumer Desktops:** Toshiba will discontinue its Infinia line of high-end consumer desktops. The vendor will sell its existing inventory and will not introduce new Infinias this year. Toshiba says it will continue to offer support to Infinia customers.

definitely consider switching," he says, "even if it involved changing my phone number."

Want a peek at the Bell vision of competition? In November, Ameritech applied to sell local phone service in Missouri—SBC Communications' turf. It would be the first deal of its kind. But rate discounts are not likely; Ameritech plans to compete by offering improved service.

GOOD-BYE, RED TAPE?

HOW ABOUT the promises of simpler regulations for market innovators, and broader access to new technologies? Much federal red tape has been cut, but new competitors selling services like fast Net access must also be approved by the states' public utilities commissions. Each PUC has different rules, so a company can't do a quick nationwide rollout.

Uniform rules sound like an impossibly good idea to Covad Communications, a California company. By the time you read this, Covad will be selling high-speed ADSL Internet access transport for $125 a month in the San Francisco Bay Area. It's preparing similar operations in other states as well.

"Many of the state rules were not even written with technologies like ADSL in mind," says Charles McMinn, CEO of Covad. The company had to hire top regulatory lawyers to draw up its applications.

Kennard says the FCC staff will be "disciples of competition," but states have their own ideas. This is clear in the FCC proceedings on universal service—the act's broadly defined goal of affordable, high-quality phone service and Net access for everyone. Legislators from rural states are most concerned with equitable rates nationwide. But others, like Rep. Rick Boucher (D-Va.), don't want services for schools to be financed through rate increases for phone users. "Universal service is a noble goal," he says. "But you have to balance that goal with reasonable rates for consumers."

Stan Coutant, professor, Sierra Madre, California

"I'd **definitely** consider switching [local phone providers], **even if** it involved **changing** my phone number."

BIG BUCKS FOR ACCESS

IN MAY 1997 the FCC approved the first big set of universal service rules, and a cap of $2.5 billion per year was set for wiring libraries and schools for Net access. As the rules stand, wireless companies contribute to the fund; ISPs don't. Schools are slated to get discounts soon, but regional Bells, paging companies, and others have challenged the rules, which the companies say will force them to raise consumer rates. The 5th Circuit U.S. Court of Appeals in New Orleans will hear the appeal soon.

PRESSURE ON STATES

MEANWHILE, each state PUC could create new consumer charges. "This may look and smell like a tax on your phone bills," Dataquest's Azuma says. This is part of the reason the FCC will put pressure on the state PUCs, says Mark Cooper, research director for Consumer Federation of America, a public interest group. Local telecom companies—big campaign contributors, employers, and tax sources—often get their way at the state level.

Fortunately, technology is moving faster than federal or state bureaucrats are writing rules. And because many new technologies avoid the phone company networks, they face fewer hurdles.

Take Internet telephony. Until now, it required a computer, was hard to set up, and had pretty bad voice quality. But at the recent Comdex trade show, a company called InnoMedia announced InfoTalk, a $299 gadget that lets you make long-distance Internet calls phone to phone, no PC required. You pay for the first minute of long distance; the rest of the call is covered by your monthly ISP fee. And AT&T is helping to fund ITXC, a company that later this year will offer routing and billing services to ISPs and phone companies that want to offer Net phone-call services without requiring customers to use special equipment.

Former FCC chair Reed Hundt says a regulation-free zone for packet-switching networks (like the Internet) is the best shot at telecom reform.

And don't forget wireless. CellularVision USA offers high-speed Net access in New York City; home users pay $49 a month. Metricom's Ricochet modems, currently available in three cities, use the radio spectrum to provide wireless e-mail for $45 per month. Low-orbiting satellites, run by Teledesic and others, will provide fast Net access without phone companies' pipes. (For more on high-speed Internet options, see "Why Can't You Get Faster Web Access?")

FINDING THE BRAVE NEW WORLD

DON'T JUST blame regulators for telecom reform's slow progress. The industry is rife with arcane systems and bitter enemies. Real competition in long distance took 13 years to develop. So wide-open competition may not be here for years.

The big question is whether the industry innovators can either push regulators to move faster, or work outside the regulatory box to create viable communications technologies that make the old phone network less attractive.

If they succeed? While the bureaucrats and monopolists fight it out in court, you might finally get what you want: better options and lower rates.

—Laurianne McLaughlin

PHOTOGRAPH: AMY ETRA

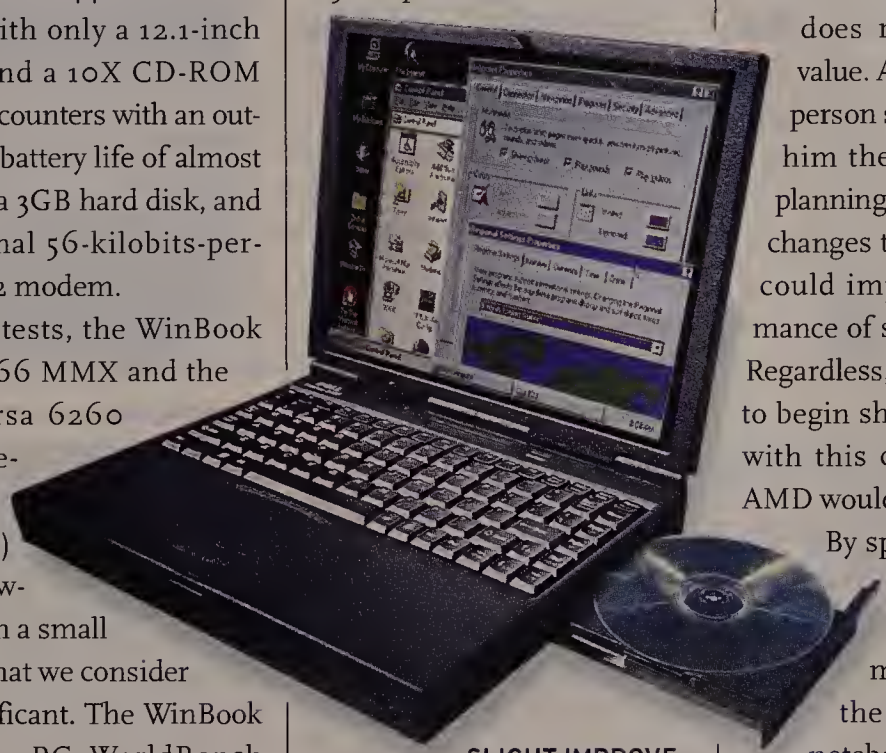
MMX-266 Notebooks: Tiny Kick From New CPUs

SOMETIMES newer isn't better. Take the latest processors for notebooks, the Intel Pentium MMX-266 and Advanced Micro Devices' K6-266. In *PC World* lab tests of PMMX-266 notebooks from Dell and NEC and a K6-266 portable from WinBook, performance wasn't significantly better than with some notebooks based on older Pentium MMX-233 processors.

FASTEST BY A NOSE

OVERALL, DELL'S Inspiron 3000 M266XT was the best of this new bunch. It set a speed record for portables, chalking up a PC WorldBench score of 250. But that score just noses out that of the previous champion, the PMMX-233 Gateway 2000 Solo 2300 XL, by less than 3 percent. Still, the Dell is a slightly better value. At $3299, it's attractively priced and comes with a generous 13.3-inch screen, a battery with an above-average 5.5 hours of life, a 2.1GB hard disk, and a 12X–20X CD-ROM drive. On the downside, Dell doesn't include a modem. By comparison, the $3474 Gateway unit, which scored 244 on our tests, comes with only a 12.1-inch screen and a 10X CD-ROM drive but counters with an outstanding battery life of almost 9 hours, a 3GB hard disk, and an internal 56-kilobits-per-second x2 modem.

In our tests, the WinBook XL K6 266 MMX and the NEC Versa 6260 (both preproduction units) were slower by such a small margin that we consider it insignificant. The WinBook yielded a PC WorldBench score of 246, and the Versa came in at 243. But the $3859 WinBook and the $4599 NEC come with more RAM and larger hard drives than the Dell, resulting in their higher prices. (Both units arrived too late to test their batteries for this article.) Like the Dell, the NEC and WinBook have large 13.3-inch displays. The Versa comes with a 5GB hard disk, a 12X–20X CD-ROM drive, and a 56-kbps x2 PC Card modem.



SLIGHT IMPROVEMENT: Dell's new Inspiron, based on a PMMX-266 chip, is the fastest notebook we've tested.

The WinBook has a 4GB hard disk, an 8X–20X CD-ROM drive, a 56-kbps K56flex modem, and a port replicator.

The K6-based WinBook XL marks AMD's entry into the Intel-dominated mobile CPU market. This is good news for consumers, as competition often spurs innovation.

HOW THE CHIPS FALL

WHILE THE WINBOOK isn't the fastest of the 266-MHz pack, it does represent a solid value. A WinBook spokesperson said that AMD told him the chip maker was planning to make additional changes to the K6-266 that could improve the performance of shipping products. Regardless, WinBook expects to begin shipping notebooks with this chip on March 1. AMD would not comment.

By spring, PMMX-266 portables will be overshadowed by models featuring the next new line of notebook processors, the 233- and 266-MHz Mobile Pentium II, code-named Deschutes. These chips are expected to offer "modest improvement" over PMMX chips of the same clock speed, says Dean McCarron, an analyst with Mercury Research. So if you're looking for something faster than a Pentium MMX-233 notebook, you may want to wait until we can test these products and determine whether newer really is better.

—*Vince Bielski*

• Dell Inspiron 3000 M266XT $3299 street as tested; Dell; 800/388-8542; www.dell.com

READER SERVICE NO. 761

• NEC Versa 6260 $4599 street as tested; NEC; 888/863-2669; www.necnow.com

READER SERVICE NO. 762

• WinBook XL K6 266 MMX $3859 street as tested; WinBook; 800/965-9349; www.winbook.com

READER SERVICE NO. 763 ▶

266-MHZ NOTEBOOKS: WAIT FOR NEXT ROUND

SYSTEMS	CPU	RAM (MB)	PC WorldBench score	Application test times (◀ Faster … Slower ▶)
Dell Inspiron 3000 M266XT	Pentium MMX-266	32	250	
WinBook XL K6 266 MMX	AMD K6-266	64	246	
Gateway 2000 Solo 2300 XL	Pentium MMX-233	32	244	
NEC Versa 6260	Pentium MMX-266	64	243	
Average of three notebooks	Pentium MMX-233	64	239	

All systems had 512KB of secondary cache.

Minutes 0 10 20

Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows · Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST We tested all systems with PC WorldBench, PC World's application-based benchmark. Higher PC WorldBench scores are better. For a description of PC WorldBench 1.0 tests, see PC World Online (www.pcworld.com/testing). Data based on testing conducted by the PC World Test Center. All rights reserved.

PHOTOGRAPH: JOHN GREENLEIGH

Justice vs. Microsoft: Battle Lines Shift to Windows 98

ANALYSIS

HOW MUCH WILL your life as a computer user change because Microsoft lost the first round in its court battle over the bundling of Windows 95 and Internet Explorer? Not a bit, at least in the short run.

If you buy a PC tomorrow, the odds are still very good that the browser you see first on your desktop will be IE 4.0.

But U.S. District Court Judge Thomas P. Jackson's preliminary injunction against Microsoft's practice of forcing PC makers to include its browser along with Win 95 is far from meaningless. The December 11 ruling is a telling legal salvo in a battle that could profoundly alter the technological landscape.

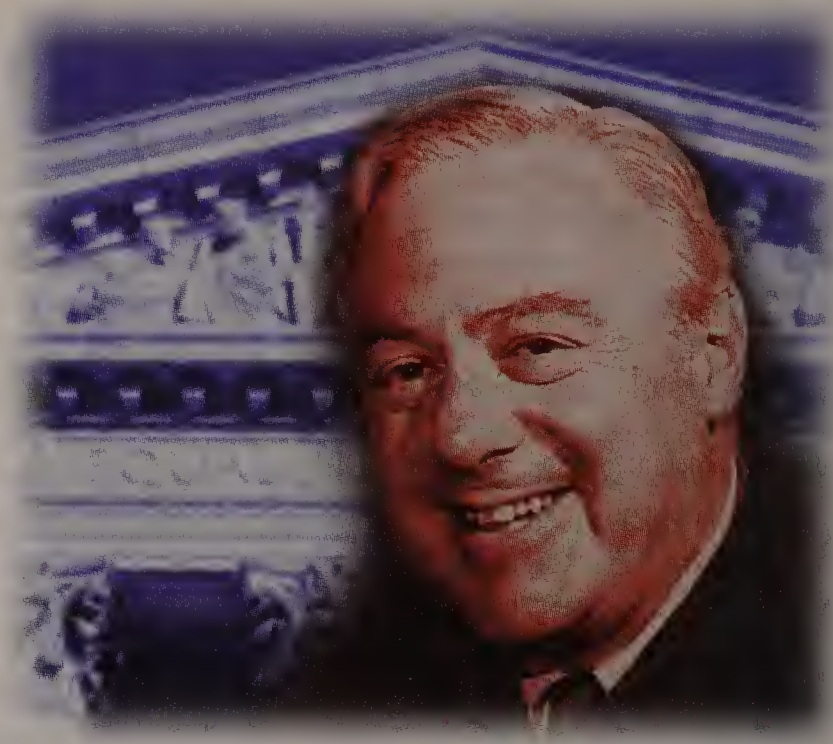
CLOUDS OF WAR

MAKE NO MISTAKE about it; the stakes are high. A skirmish over business practices that once affected PC users only indirectly has escalated into a full-scale war over the future of Microsoft's core business—operating systems.

Jackson's initial ruling was aimed at Windows 95, an OS approaching the end of its life. But when the court reconvenes in late May, the fate of Windows 98 and Windows NT, Microsoft's next-generation OSs, will be on the table because those systems will fully integrate IE.

In May the judge will hear a report from Lawrence Lessig, an authority on Internet law appointed to review the case. But before that issue is argued, Microsoft and the government will face off at a Jan. 13 hearing over the company's alleged contempt of the judge's order.

To understand the basis for that allegation, first consider this: In the days following the ruling, major computer makers said that they planned to continue bundling Internet Explorer 4.0 despite their newfound freedom to eschew it. In fact, Microsoft estimates that more than 70 percent of the PCs built in December shipped with a copy of IE 4.0 on their hard drives. Nevertheless, Microsoft took an aggressive posture.



JUDGING MICROSOFT: U.S. District Court Judge Thomas P. Jackson says "tying" Win 95 and IE 4.0 is unfair. Microsoft has appealed.

First, the company appealed Jackson's order. Then it offered computer makers three choices: They could ship Windows 95 with Internet Explorer integrated (business as usual), ship a crippled, unbootable version of Windows 95 without the browser, or ship a two-year old version of Windows 95.

MATTER OF CONTEMPT?

THOSE CHOICES angered the Justice Department, which quickly responded by asking that Microsoft be held in contempt, calling the company's three options "a mere mockery" of Jackson's order.

So the more meaningful issue is Jackson's decision to put the future of Win 98 on the table. Many observers expect that at the least, the new operating system could be delayed. At worst (from Microsoft's point of view), it may have to be drastically rewritten, keeping users waiting even longer.

"The court may say that you cannot bundle the functionality of a Web browser into an operating system," says Ian Feinberg, an antitrust attorney with Gray Cary Ware Freidenisch in Palo Alto, California. If that's the case, break out the Cokes and pizza—those coders will have a lot of work to do. ▶

History Repeats: Fighting Microsoft's Dominance

August 1993: The Justice Department begins investigating Microsoft's business practices.

October 1994: Microsoft announces plans to buy Intuit, developer of Quicken, the leading personal finance program. When the Justice Department sues to block the acquisition, Microsoft calls off the deal.

June 1995: Court upholds the Justice Department/Microsoft consent decree. Microsoft agrees not to tie the licensing of Windows to the licensing of other applications, but retains the right to develop "integrated products."

September 1996: The Justice Department begins investigating Microsoft's bundling of Internet Explorer with Windows 95.

April 1997: The Justice Department investigates Microsoft's plan to buy WebTV Networks; later allows deal to go forward.

August 1997: The Justice Department reviews Microsoft's investment in Apple Computer.

October 1997: The Justice Department charges that by requiring computer vendors to load Internet Explorer on all systems, Microsoft is in violation of the 1995 consent decree.

December 1997: U.S. District Court Judge Thomas P. Jackson orders that the "tying" of IE 4.0 to Windows be temporarily halted. Microsoft quickly appeals.

PHOTOGRAPH: AP/WIDE WORLD PHOTOS; PHOTO-ILLUSTRATIONS: JEFF BERLIN

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NEW LEGAL CHALLENGES

PERHAPS MORE LIKELY, Feinberg and other experts say, is an order forcing Microsoft to create two versions of Windows 98—one with Internet Explorer and one without it. A browserless Windows 98 would be "brain-dead," says Goldman Sachs analyst Rick Sherlund, and even Microsoft believes that it would not be popular.

What would follow? "The win will embolden Justice to further pursue Microsoft," predicts Steven Newborn, of the antitrust practice group of Rogers & Wells' Washington, D.C., office. And in December, representatives of attorneys general from several states met to coordinate possible antitrust enforcement plans against the company.

Future arguments will probably center on the meaning of the word "integrated." While forbidding the forced bundling of products, the 1995 decree said: "This provision shall not be construed to prohibit Microsoft from developing integrated products."

> "It's our product and **we get to define what's in it,**" says William Neukom, Microsoft's **chief counsel** and senior vice president for law.

"It's our product and we get to define what's in it," says William Neukom, Microsoft's chief counsel and senior vice president for law. To Microsoft, integrating the browser, in much the same way earlier OS versions integrated file management, is entirely logical.

But the judge seems to disagree. "Microsoft's unfettered liberty to impose its idea of what has been integrated into its operating system stops at least at the point at which it would violate established antitrust law," Jackson wrote.

That, of course, is what Netscape has been hoping to hear. Microsoft has recently doubled its share of the browser market. Without relief, Netscape could suffer the fate of utility software vendors that folded after Microsoft absorbed the functions of their products into Windows. Even with government help, overcoming Microsoft would be very difficult, says analyst Jim Balderston of Zona Research in Redwood City, California. "It's an opening, but not a very big one," he adds.

GATEKEEPER DILEMMA

SOME SAY THAT forcing Microsoft to rework its road map would set a risky precedent: governmental meddling in software development. But others warn that the alternative is Microsoft's domination of the Net. "If every Windows PC connects first to a Microsoft gateway to the Internet, that gives one company extraordinary control over what is available and who gets paid for it," says Jeffrey Tarter, editor of *Softletter*, an industry newsletter in Watertown, Massachusetts.

United States of America v. Microsoft Corporation is a uniquely American battle, pitting the world's most successful software company against the world's most powerful government. The last antitrust case to capture the public imagination to this degree was the breakup of AT&T. This case may not have a similar ending, but the stakes could be almost as high.

—Bill Snyder and Roberta Furger

For updates of this fast-moving story, visit www.pcworld.com/microsoftnews/.

1040, Good Buddy: New Tax Software

MANY TAX preparation programs have crashed and burned over the years, but Intuit's TurboTax and Block's Kiplinger TaxCut have justly survived. This year the only two full-featured lines of tax software have skipped their usual "planning editions" and gone straight to the filing editions. And both offer CD-ROMs with multistate add-ons—handy if you need to file in more than one state. Also new (in all but the basic TurboTax package) is free electronic filing, worth considering if you'd like to expedite a refund.

The two programs have borrowed each other's best features until they've become siblings, if not quite twins. Both Windows-only interfaces (TurboTax has finally abandoned DOS) are now so friendly that they practically climb into your lap. They shepherd you through your return with Q's and A's written in plain English, not "taxlish," performing all calculations as you enter your figures. You can either work directly on forms or—new this year—zip through a fast-track interview to bypass unneeded tax topics.

> Also **new** (in all but the basic TurboTax package) is **free electronic filing,** worth considering if you'd like to **expedite** a refund.

Deluxe CD-only versions offer reams of tax lore, context-sensitive guidance via short videos, terrific on-screen manuals, and IRS instructions. The basic versions cost less and require fewer system resources, but their advice is much skimpier, albeit adequate for simple returns. (If you're a Windows 3.1 mossback with Norton Desktop or a similar Windows shell, you can't use the deluxe versions without disabling the shell first—a frustrating prospect.)

Both programs also come with planning features, what-if scenarios, and final audits to spot gross irregularities. (TurboTax for Business includes everything on TurboTax Deluxe plus extra forms and more small-business tax help.)

The two programs aren't identical. TurboTax works easily with Quicken files, while TaxCut imports directly ▶

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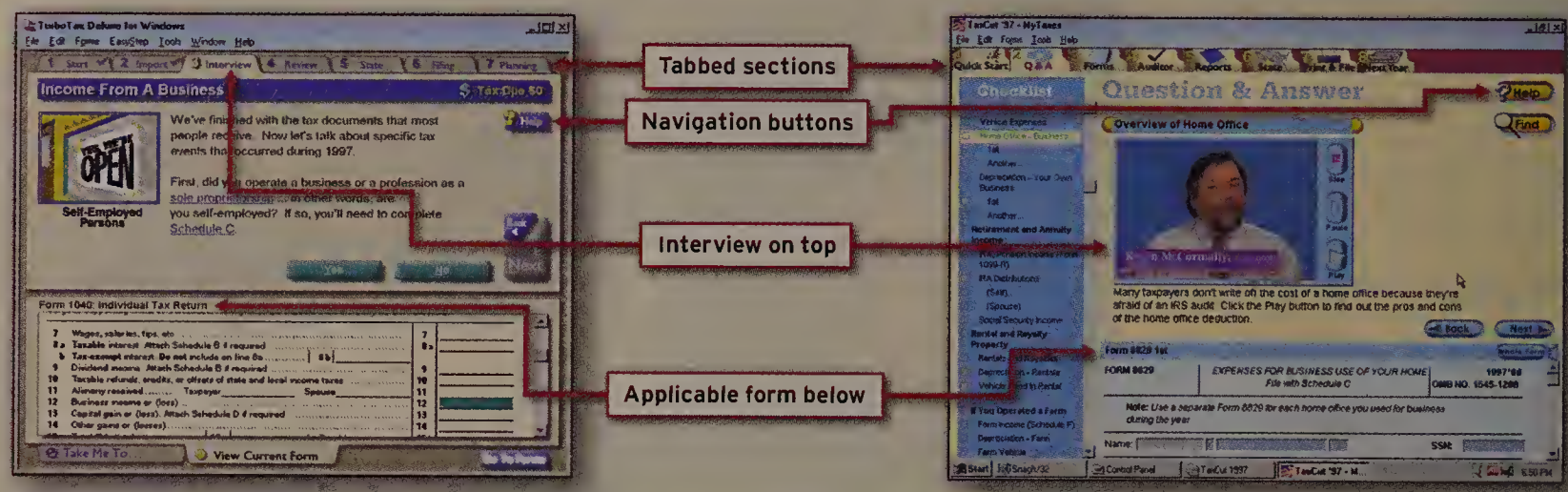
Virtual Accountants, Virtual Clones

TAX LOOK-ALIKES: Striving to be user-friendly, TurboTax and TaxCut have borrowed each other's best features and now look very much alike.



from Managing Your Money (but each can handle data from any money management program). TaxCut can also import data from last year's TurboTax return. The programs' depreciation schedules are slightly different, so switching can be a problem if you're in mid-depreciation on any assets. TurboTax offers more state editions.

TaxCut used to be faster and friendlier, but judging from the preproduction versions I examined, TurboTax has more than caught up. Its turbo-charged navigation features let you leap around to forms and interview topics and then return to your takeoff point. The one-click help usually takes you straight to the relevant tax advice. TaxCut's navigation takes you back to the start of the topic where you were working, and its rapid-find help button also accesses advice at the top of your topic. As usual, TurboTax's printouts were crisp. While TaxCut's America Online forum is full of complaints about printing problems with prior versions, this year's edition produced a neat, clean document.

ONLINE UPDATES

WHICHEVER program you buy, you'll probably have to download patches from its Web site (or get them in the mail) to handle bugs or last-minute tax-law changes.

Both programs have had problems with electronic filing in the past, working with an outside contractor. This year Intuit has taken e-filing in-house, while TaxCut has contracted with industry leader Nelco. It's anybody's bet which will be more efficient.

You can get tax forms online (with or without automatic calculations) as either freeware or low-price shareware. The $49 TaxSolver, for example, has the same forms as TurboTax for Business, but the $20 savings does not compensate for its lack of features and speed. Another new program, TaxChecker ($49 individual, $89.95 business), runs a simulated IRS audit on your completed return.

But most people will want to go with the industry leaders—and with TurboTax Deluxe for most returns. TaxCut remains a good choice if your return is simple, you expect to file electronically, and you need to save $10 or $15. Otherwise, the speed and sophistication of TurboTax makes a horrid task not exactly easy—but easier.

—*Naomi Wise* ▶

Tax Twins: TaxCut and TurboTax Grow More Alike

PRODUCTS	Street price[1]	System requirements	Floppy disks available	Electronic filing	Special features	Reader service number
Block Financial Kiplinger TaxCut 800/235-4060 www.taxcut.com	$20	386, Windows 95 or 3.1, 2X CD-ROM drive, 4MB of RAM, 18MB of hard disk space	●	free	password protection	753
Block Financial Kiplinger TaxCut Deluxe	$40	486, Windows 95 or 3.1, 8MB of RAM, 20MB of hard disk space	○	free	password protection, Kiplinger tax publications and videos, one month free Web access	754
Intuit TurboTax 800/446-8848 www.intuit.com/turbotax	$35	3B6DX, Windows 95 or 3.1, 2X CD-ROM drive, 4MB of RAM, 20MB of hard disk space	●	$9.95	free trial version from Web site	–
Intuit TurboTax Deluxe	$50	486DX-33, Windows 95 or 3.1, 2X CD-ROM drive, 8MB of RAM, 20MB of hard disk space	○	free (after rebate)	*Money Magazine's Income Tax Handbook* and *How to Pay Zero Taxes*, one month free Web access	–
Intuit TurboTax for Business	$70	4B6DX-33, Windows 95 or 3.1, 2X CD-ROM drive, BMB of RAM, 41MB of hard disk space	○	free (after rebate)	TurboTax Deluxe features plus publications, forms, and help for sole proprietorships, partnerships, corporations, and S-corporations	–

● Yes ○ No

[1]State editions: TaxCut (24 states) $24.95 for CD-ROM or floppies for one state; TurboTax (45 states and District of Columbia) $27.95 for one, $19.95 to $27.95 for additional states; TurboTax for Business $27.95 to $39.95.

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s performed using Ziff-Davis(R) WinBench(TM) 98, version 1.0. Tests performed without independent verification by Ziff-Davis who makes representations or warranties as to the results of this test. Specific system and product configuration information for this test may be found at www.diamondmm.com/benchmarkid/10001. © 1997 Diamond Multimedia Systems Inc., 2880 Junction Avenue, San Jose, CA 95134. All rights reserved. WinBench and WinMark are registered trademarks of Ziff-Davis Inc. in the U.S. and other countries.

WinBench 98 (Measured in WinMarks)

Diamond Viper V330	137
Matrox Millennium II	132
STB Velocity 128	109

WinBench 98 (Measured in WinMarks)

Diamond Viper V330	485
STB Velocity 128	437
Matrox Millennium II	84.8

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CG CHOICE

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CONSUMER ALERT

YOU PROBABLY DON'T know it, but the ink and toner cartridges you use in your printer every day are the subject of court battles that could hit you right in the pocketbook.

On one side stand printer makers Canon, Epson, and Hewlett-Packard, which are determined to protect their shares of the vast ink and toner market. On the other side are companies that sell discount "consumables"—refilled cartridges, clone cartridges, and refill kits—including Nu-kote, Repeat-O-Type, and Xerox.

The legal issues in the lawsuits are technical and esoteric: How big can a competitor's name appear on your packaging? Is it all right for you to redesign an ink cartridge in such a way that it makes it harder to refill?

But the motivation for them is transparent: Ink and toner supplies have become enormously profitable. Toner cartridge sales alone were about $5.5 billion in 1996, according to International Data Corporation analyst Keith Waryas.

If the printer vendors win in court, you'll pay more for supplies. But the vendors will have strong motivation to improve their products because their focus will remain on competing with each other. If the discounters come out of court unfettered, the major players will have to compete against them on price.

Some discount products offer a savings of up to 25 percent. But are they as good as the originals? *PC World* tests using HP's LaserJet 5M and Canon's BJC-4200 do show that they're close—but not quite equal (see chart).

ARE THEY REAL? The labels may look alike, but some of these printer cartridges were refilled by other companies, and some were cloned.

No-Name Cartridges Beat Premium-Price Blues

BRANDS	Best price	Savings (percent) [1]	Notes on quality
HP LaserJet 5M toner			
HP	$89.99 [2]	n/a	solid black with crisp texture
Xerox	$81.99 [3]	9	crisp texture, in one case yellowish cast
generic [4]	$79.95 [5,6]	11	slight streakiness
Canon BJC-4200 ink			
Canon black	$6.99 [2]	n/a	deep black, clear edge definition
Canon color	$19.99 [2]	n/a	bright, realistic colors; clear edge definition
Nu-kote black	$5.59 [2]	20	good black but slight bleeding/blurring
Nu-kote color	$15.99 [2]	20	good colors but slight bleeding/blurring
JetFill black	$6.50 [5]	7	good black but slight bleeding/blurring, splatter
JetFill color	$14.95 [7]	25	colors slightly off, some bleeding/blurring

n/a = not applicable. [1] With cheapest name-brand unit compared to cheapest discount unit. [2] From Office Depot. [3] From Staples. [4] Locally remanufactured, no brand identification. [5] From small local office-supply store. [6] Includes $10 refund for empty cartridge. [7] From PC Connection.

WHO'S SUING—AND WHY

HP, EPSON, Canon, Nu-kote, and Xerox are caught in a morass of alleged patent and trademark infringements. Last summer, for instance, HP moved the fill holes on some ink jet cartridges from the top to the bottom. HP spokesperson Jeremy James says HP redesigned them primarily to cut costs. But Nu-kote's senior vice president for product development, Ian Elliott, charges HP with deliberately obstructing his company's ability to refill the cartridges: "It is our belief that this is part of a concerted effort to get us out of the aftermarket." And the costs for litigation and extra engineering are damaging the company, he adds.

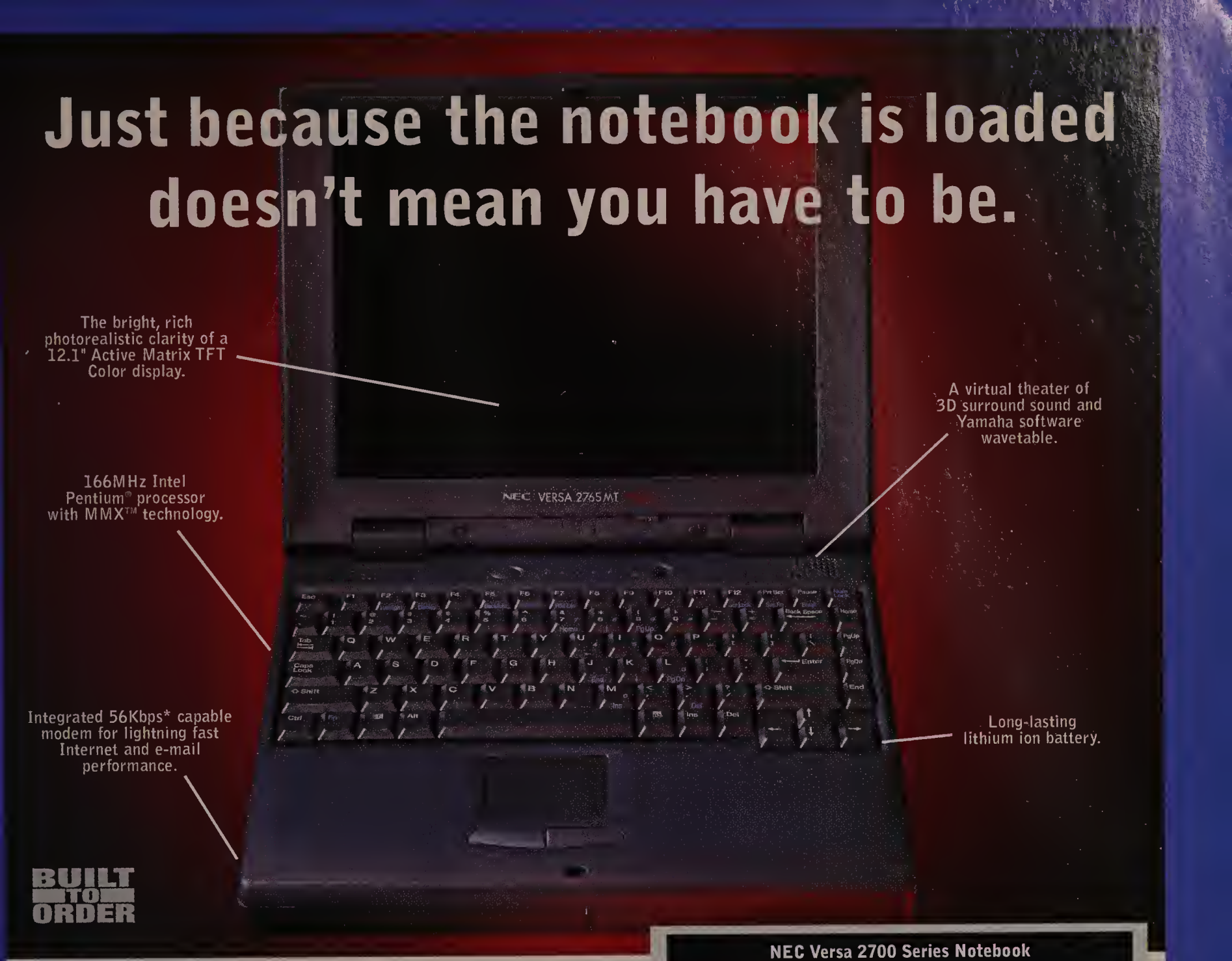
In September Xerox spiffed up its remanufactured HP toner cartridges with new packaging. The next month HP hit Xerox with a suit alleging that the new box displays HP trademarks in a way that might make consumers believe they're buying an HP-approved product.

POINT AND COUNTERPOINT

DESPITE THEIR hardball tactics, the printer vendors acknowledge the discounters' right to exist: Consumers have the right to choose their own supplies, says HP's James. But the alternative suppliers have to operate legally, he adds. And while the legal wrangling goes on, HP, Epson, and Canon ▶

PHOTOGRAPHS: JOHN GREENLEIGH

Just because the notebook is loaded doesn't mean you have to be.



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are trying to persuade their customers not to use discount products. They claim that:

- Their products work better with proprietary specialty paper. Vendors promote inks and papers that are chemically designed for each other, and *PC World* testing has shown that the complementary inks and papers do produce better print quality (this issue does not affect laser printers).
- Parts of your warranty may be void if a discounter's ink or toner damages your printer. Federal law forbids flatly voiding a warranty. But Epson attorney Alf Andersen says, "If a consumer chooses to use another product, and it's our determination that the product contributed to a failure, then we don't consider ourselves obligated to repair the product."

And perhaps most seriously of all, the printer vendors charge that third-party consumables can damage your printer. HP's James claims that ink leaking from clone cartridges is responsible for serious damage to logic boards on about 25 percent of the printers that HP repairs.

But repair technicians who were interviewed at a number of computer shops disagree. One comment, from a technician who asked not to be named, expresses a rough consensus: "I've seen one [HP ink tank] leak, but that was because the customer had overfilled."

Nu-kote's Elliott acknowledges that leaks from his company's cartridges did damage some Canon BJC-600 series printers, but he claims that the problem was inherent in Canon's design and affected new ink cartridges as well as refills.

In the end, it comes down to a struggle that pits the R&D-heavy giants against entrepreneurial imitators. The big picture showcases intellectual-property rights, fair trade, and the role of the courts in protecting and regulating the market. Some people argue that a price war will lead to reduced R&D spending by printer companies. But for users, the issue is more straightforward: Do you want unrestricted competition or don't you?

Don't expect a resolution right away. Unless an agreement is reached, at least two of the major lawsuits are expected to continue well into 1999. Until then, the best advice we can give you is this: Do your own cost-benefit analysis. If you can afford to lose a little bit of quality to save a noticeable amount of money, check out the clones. If not, stay with the major players.

—Dan Littman

Right Stuff or Not?

BJC-4200 CANON INK More expensive: Results were best—the colors were sharp and true—using the Canon ink cartridge.

JETFILL CLONE Less expensive: We saved some money, but the print quality was not quite as good. Note the helmet's color.

Oracle's $250 Computer Finally Arrives—But It Doesn't Compute

THE LONG-awaited Network Computer, advertised on TV as the budget alternative to PCs for those seeking Internet access, is now at a consumer electronics store near you. But RCA's new $250 NC has far more in common with WebTV than with even the most spartan desktop system. The consumer version of the device, designed by Oracle's Network Computer Inc., cannot calculate, do word processing, or even play games.

But when hooked up to your TV set or monitor and a phone line, it lets you surf the Web. A chat button brings up a list of rooms hosted by the BeSeen.com Web site, and you can send and receive e-mail messages.

Even those basic Net services—which come courtesy of the bundled $19.95-per-month NetChannel online service—have limitations. The proprietary browser is not Java-enabled, so you can't access the more interactive features on many Web sites, and there's no provision for e-mail attachments.

The Network Computer will download two days' worth of your cable company's program guide for offline use. You can search the listings to find a favorite show or star or let the software suggest a program you'd like.

The corporate edition of the Network Computer, which is not available at retail, must be used with a PC server that hosts the operating system and all productivity applications. That system, which we haven't tested, may someday be an alternative to the PC. But this consumer version doesn't come close.

—Yardena Arar

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32X CD-ROMs Up Ante—But Add Little Value

CD-ROM DRIVES are getting faster and faster. Or are they? The latest drives boast a maximum 32X speed—fully one-third faster than the previous maximum of 24X. Two companies, Plextor and Teac, with several more to follow, have started shipping 32X drives (which have a 4800-kilobytes-per-second maximum transfer rate), with promises of faster database lookups, improved multimedia performance, and quicker transfers of large files.

THE X-RATING TEASE

BUT DON'T LET the X rating influence your buying decision. The 32X drives actually offer few noticeable performance advantages over 24X drives, our testing shows.

The 32X units do get a minimal speed boost from the more powerful motors that spin the disc faster, and from improved circuitry and error correction capabilities. But they generally obtain the 32X speed only on a disc's outer tracks—which is why manufacturers rate the drives as, for example, 14/32X. There's a catch, however: Data rarely fills the outer tracks, so drives rarely read at 32X.

But even faster spin rates haven't shortened the 85-millisecond access time (versus 10ms for a hard drive) that is standard for most higher-quality 12X or faster drives. This uniformity in access speeds makes it hard to squeeze out far better performance, no matter how fast you spin the disc. "Drive makers and computer manufacturers simply want to have a few more Xs to advertise," says analyst Jim Porter, president of Disk/Trends. "Functionally there is negligible, if any, benefit to the end user."

32X "IMPROVEMENT"

WE TESTED the new 32X drives from Plextor and Teac and compared them to an ACS (Panasonic) 12X–24X drive, to Hitachi's second-generation DVD-ROM drive, and to a Plextor 12X–20X unit. We found Porter's comment accurate: Our results show little difference between the 24X and 32X drives, particularly when using real-world applications. (Consistent with previous *PC World* tests, SCSI drives outperformed IDE units with higher X ratings.) Loading a 19MB photo file on a 32X drive took only a few seconds less than on 20X or 24X equivalents.

Reading data from outer disc tracks can be a problem. For example, disc wobble, which can cause numerous read errors, is particularly troublesome on the outer tracks. The Teac and several 24X drives slow down accordingly to compensate. The Teac unit had trouble reaching its 32X maximum rate on the outer tracks; the best that it could achieve was 30X performance. The Teac also was inexplicably unable to read an AVI movie file. Teac's engineers acknowledged that this happened on their tests as well.

In any case, 32X is probably the last CD speed iteration. Within six to nine months, prices of DVD-ROM drives will likely drop to CD-ROM levels. By sometime in 1999 the industry expects they will surpass CD drives in sales.

So should you upgrade? If you have a slow drive and regularly load large files or do CD database searches, a 24X or 32X drive could be helpful. The 32X drives will soon sell for current 24X prices, and good 24X units are now dropping to less than $100. So sit tight—there's no reason to suffer from 32X envy.

—Jeff Sengstack

• Plextor UltraPlex SCSI internal tray $249 list, internal caddy $289, UltraSCSI or SCSI-2 card extra; Plextor Corp.; 800/886-3935; www.plextor.com

READER SERVICE NO. 759

• Teac 32X IDE internal tray $149 list; Teac America; 213/726-0303; www.teac.com

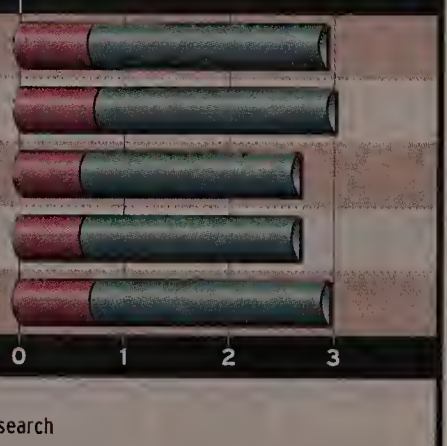
READER SERVICE NO. 760

PLEXTOR'S ULTRAPLEX SCSI may say 32X on the box, but it rarely reaches that spin rate.

PHOTOGRAPH: JOHN GREENLEIGH

MIND YOUR Xs: 32X OFFERS MODEST BOOST

DRIVES	Minimum speed rating[1]	Maximum speed rating[1]	Overall speed rating[1]	Multimedia rating[1]
Hitachi 2X DVD-ROM	8.7X	19.6X	12.7X	45
ACS (Panasonic) 12X-24X IDE	10.2X	23.3X	14.7X	53
Plextor 12X-20X SCSI	12.3X	20.1X	16.4X	97
Plextor 14X-32X UltraSCSI	14.9X	32.5X	21X	103
Teac 14X-32X IDE	15X	30.1X	19.1X	65



[1]Higher is better. Load 19MB PhotoCD file. Phonedisc search.

HOW WE TEST Drives were tested on a Pentium-200 PC using CD-Tach testing software from the independent Testa CD Labs, as well as PhotoCD and Phonedisc application testing. CD-Tach measured throughput rates, determined multimedia scores, and ran other low-level tests to derive an overall speed rating.

ONCE AGAIN, THE EXPERTS RECOGNIZE THE FOUR-WHEEL DRIVE EXPERTS.

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4X4 OF THE YEAR

PETERSEN'S 4WHEEL & OFF-ROAD

1988 JEEP® CHEROKEE
4X4 OF THE YEAR

PETERSEN'S 4WHEEL & OFF-ROAD

1993 JEEP® GRAND CHEROKEE
4X4 OF THE YEAR

PETERSEN'S 4WHEEL & OFF-ROAD

1996 JEEP® GRAND CHEROKEE
4X4 OF THE YEAR

PETERSEN'S 4WHEEL & OFF-ROAD

1997 JEEP® WRANGLER
4X4 OF THE YEAR

PETERSEN'S 4WHEEL & OFF-ROAD

1998 JEEP® GRAND CHEROKEE 5.9 LIMITED
4X4 OF THE YEAR

JEEP® NAMED 4X4 OF THE YEAR MORE TIMES THAN ANY VEHICLE ON EARTH.

When it comes to four-wheel and off-road driving, no one puts vehicles to the test better than *Petersen's 4-Wheel & Off-Road* magazine. And, time after time, the brand that emerges victorious is none other than Jeep.

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In fact, no other brand of 4x4s in the world has won more awards than Jeep. So, when it comes to determining the leader in four-wheel drive, do what the experts do: choose a Jeep 4x4.

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*Based on 0-60 acceleration. Always use seat belts. Remember, a backseat is the safest place for children. Jeep is a registered trademark of Chrysler Corporation.

New Web Name Game: .com, .org, .net to Get Siblings Soon

ANALYSIS

UNTIL NOW, registering an Internet domain name has been a no-brainer for businesses and consumers. That's about to change.

A proposal by the Clinton administration to privatize registration of domain names (addresses like widgets.com) will make the process more complex but give users unprecedented freedom and choices. You'll be able to select a firm to register domain names for you and have the chance to buy new services that will make that name a better commercial tool. There may even be seven new *top-level domain names*—short suffixes like .firm—to choose from.

ON YOUR OWN

BUT WITH Big Brother leaving the scene, owners of domain names will have to look after themselves. They'll need to exercise special care when picking a registration firm. The wrong choice could lead to a myriad of hassles—or even the loss of a domain name.

At the moment, registration for the Internet's three most popular top-level domain names—.com, .net, and .org—is the responsibility of the National Science Foundation; its exclusive contractor, Network Solutions of Herndon, Virginia; and subcontractors. But not for much longer.

Under the Clinton plan, instead of the National Science Foundation, a self-governing body of private firms will allocate and manage the Net domain name system. Exactly how those firms will work together to enforce policy and what entity might regulate them is not yet clear.

The final version of the plan is expected in early 1998. But it won't take effect until sometime after the April 1 expiration of the NSF–Network Solutions contract. Nevertheless, anybody who owns a domain name had better pay attention to developments unfolding now.

Network Solutions is already working on new offerings. These will include directory services (which make sure your domain name is registered on all Internet database directories) and the issuance of security certificates for electronic-commerce transactions.

Though Network Solutions has no immediate plans to change its pricing, a company spokesperson says the open market will probably lead to lower prices. Network Solutions charges its customers a flat $100 for the first two-year registration period and $50 for every year thereafter.

NO GUARANTEES

CONSUMERS AND businesses that now register through an Internet service provider, which acts as an intermediary with Network Solutions, often pay a premium to the ISP. Under the new plan, ISPs could themselves become registration firms.

Why is Network Solutions considering new services? Competition. The Swiss-based Council of Registrars (www.core.gtld-mou.org), an international association of registration firms with 89 members worldwide, is eagerly awaiting the Clinton plan.

Some of the new players are already taking preregistration requests, including cash deposits for the proposed additions to the list of top-level domain names.

Other firms advise holding on to your checkbook. "We don't feel comfortable taking any money [although reservations will be accepted] because we have no idea whether or not these domains will be put into effect," says Ken Leonard, CEO of Tabnet, a major Network Solutions subcontractor.

In fact, there are really no guarantees about anything going on with the domain name registration process other than the fact that its privatization is imminent. "This is not the time to sit passively by," says Michael Krieger, Internet specialist with San Francisco–based Bronson, Bronson & McKinnon. "It's a time that is going to require some real homework."

—*Holly Hubbard Preston* ■

ILLUSTRATION: JOHN BLECK

How to Survive the Domain Name Shake-Up

- ❑ Select registration firms that have some demonstrable level of infrastructure, including an established software database, for allocating and managing domain name registration. Network Solutions and Tabnet have good reputations, but don't write off the newcomers.
- ❑ In addition to registering your domain name in the United States, consider registering in foreign countries where you might do business. Use a geographically specific domain name such as .uk.
- ❑ Do your homework. Here are some sites that may be helpful:

www.ntia.doc.gov/ntiahome/domainname/domainname.htm
www.inta.org
www.isoc.org
www.cookreport.com

So, do you
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there's
intelligent life
out there?

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In the PC industry, technology can change at the speed of light — but Gateway's customer loyalty is as constant as the sunset.

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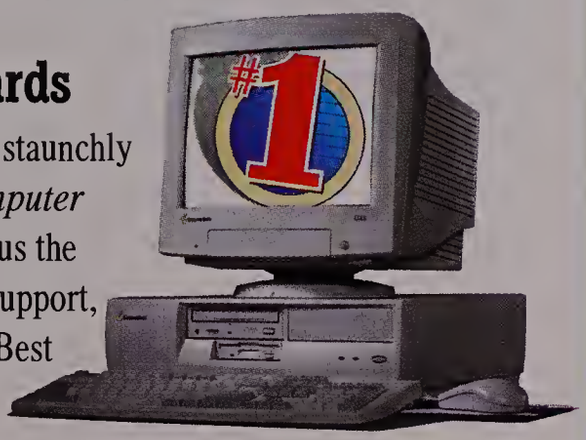
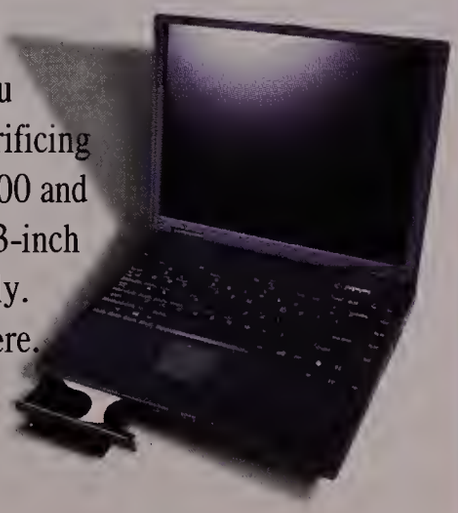
**Restrictions exist in certain areas. Local access areas identified in registration process.*

Computer Shopper Awards



It's no secret Gateway customers are staunchly loyal. We'd like to thank all the *Computer Shopper* readers out there who gave us the nod for their 1997 Best Service and Support, Best Place to Buy a Desktop PC and Best Value Desktop PC awards.

Cosmic Displays



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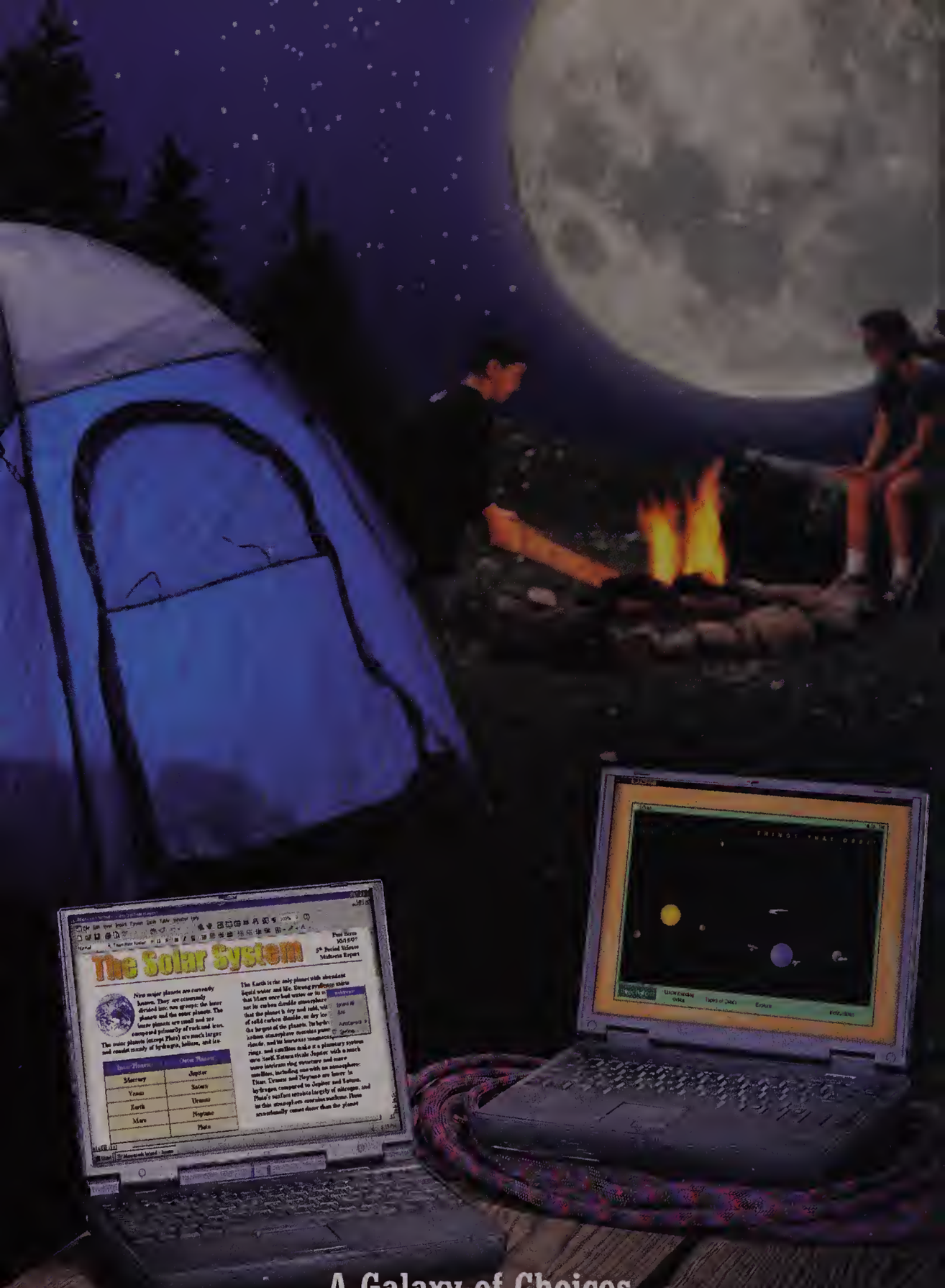

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Gateway Solo 2300SE, **Windows Sources** *Stellar Award, October 1997*

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Gateway Solo 9100, **Home Office Computing** *and* **Small Business Computing** *1997 Editors' Pick*

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***Maximum data transfer rate dependent on certain variables including particular modems with which you are communicating, telephone lines, communications software and communications protocols.*

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- ECC Memory System
- 4GB Ultra Wide SCSI-3 5,400 RPM Hard Drive
- Integrated Ultra Wide SCSI-3 Controller
- 12X SCSI CD-ROM Drive & 3.5" Diskette Drive
- 3Com 10/100 Twisted Pair Ethernet Adapter
- Four 32-Bit PCI, One EISA, Two PCI/EISA Slots
- 4 DIMM Slots
- EV500 .28 Screen Pitch 15" Monitor (13.9" viewable)
- Integrated 32-Bit PCI Graphics with 2MB DRAM
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- 8MB 3-D AGP Graphics
- 4GB 11ms Ultra ATA Hard Drive
- 13X min/32X max CD-ROM Drive
- 3.5" Diskette Drive
- GP-Series Mid-Tower Case
- 104+ Keyboard & MS IntelliMouse
- MS Windows 95 & MS Office 97, Small Business Edition plus Bookshelf 98
- Gateway Gold Service & Support for GP-Series PCs

$1999 Gateway GoldValue Lease† $71/mo.

Gateway GP6-233,* PC World *Power Desktop, October 1997

GP6-266

- Intel 266MHz **Pentium II** Processor with 512K Cache
- 64MB SDRAM
- EV700 .28 Screen Pitch 17" Monitor (15.9" viewable)
- 8MB 3-D AGP Graphics
- 6.4GB 10ms Ultra ATA Hard Drive
- 13X min/32X max CD-ROM Drive
- 3.5" Diskette Drive
- GP-Series Mid-Tower Case
- 104+ Keyboard & MS IntelliMouse
- MS Windows 95 & MS Office 97, Small Business Edition plus Bookshelf 98
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GP6-300 BEST BUY

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- 13X min/32X max CD-ROM Drive
- 3.5" Diskette Drive
- GP-Series Mid-Tower Case
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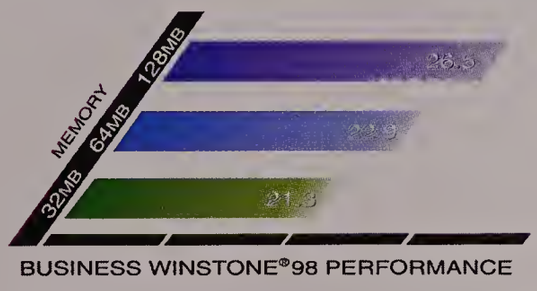

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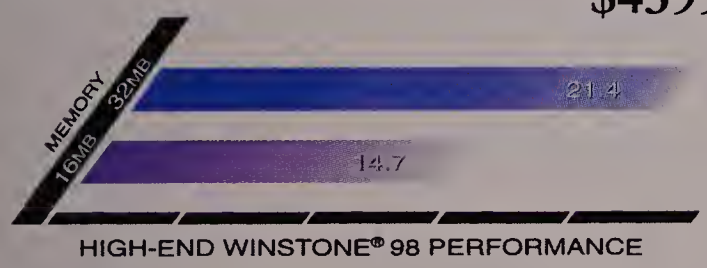

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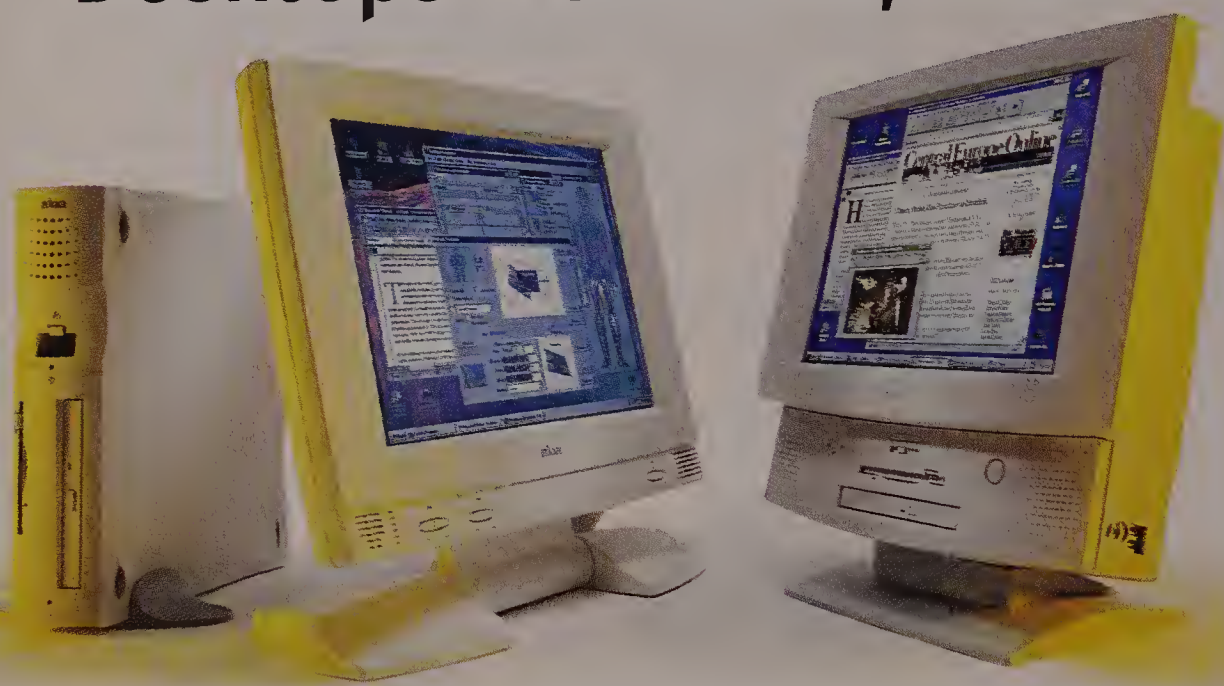

DON'T BOX ME IN: The Akia Mystique M233 (left) and Hitachi VisionDesk PCs have LCD panels for a slim desktop profile. Both systems perform well—but don't make any expansion plans.

DESKTOP

DESKTOP PCS usually come in two styles: boxy and boxier. But one look at Akia's and Hitachi's sleek new desktops tells you they're designed for the most stylish of offices. These futuristic systems pair flat-panel liquid crystal displays with "microfootprint" system units, and they take a fraction of the desk space required for a conventional desktop or tower unit and monitor.

These types of PCs, which are as fast as their traditional counterparts, could become the newest corner-office perk. We tested a shipping version of the $3898 **Mystique M233** by Akia and a preproduction unit of Hitachi's $3599 **VisionDesk.** The Akia's PC WorldBench score of 235 matches the average for Pentium MMX-233 desktops tested by *PC World* to date. Benchmark testing for the Hitachi was not complete at press time, but we expect results similar to the Akia's.

Besides style and size, the biggest advantage of either system is the LCD panel. The display is much more vibrant than what you see on traditional CRT monitors, with no glare, harshness, or flicker. LCDs also use less power and have lower EMF emissions.

What are the drawbacks of these unusual systems? Price is probably the biggest one—and that's because of those appealing displays. Prices for flat-panel LCDs have steadily dropped in the past year, but most still cost at least twice as much as CRT displays with larger viewing areas—a difference reflected in the prices of the VisionDesk and Mystique systems. By comparison, a similarly configured traditional Pentium MMX-233 PC with a 15-inch monitor costs about $2000, a little more than half as much. When you consider that 14.5-inch LCD panels sell separately for about $2500, the Akia and Hitachi system prices become understandable—though certainly not practical for many people.

Also, these units' compact case size translates into quite limited expandability. The Mystique has only one open PCI slot and no open drive bay, internal or external. The VisionDesk has two open slots but no open drive bay. So consider future expansion plans carefully before getting caught up in deciding which system will look best on your desk.

MYSTIQUE'S APPEAL NO MYSTERY

CHOOSING BETWEEN the Akia and Hitachi systems becomes, in part, a matter of personal style. I preferred the elite look of the Akia Mystique M233's design and the fact that its LCD panel and CPU are different units (the two are

Akia Mystique M233

PRO: Large LCD screen, sleek and smart design.

CON: Almost no expansion room.

VALUE: High style at a high price, but impressive.

Akia Corp.

800/936-5481

www.akia.com

Street price: $3898

READER SERVICE NO. 719

Hitachi VisionDesk

PRO: Stylish small-footprint desktop system.

CON: Almost no expansion room.

VALUE: Unusual all-in-one unit is worth considering.

Hitachi PC Corp.

800/448-2244

www.hitachipc.com

Street price: $3599

READER SERVICE NO. 720

integrated in the Hitachi system). In addition, the Akia's LCD panel is slightly larger than the Hitachi's.

The Akia system unit comes with 32MB of RAM, 512KB of secondary cache, a 4.3GB hard disk, an 8X–16X CD-ROM drive, Universal Serial Bus and infrared ports, and an ethernet connector. Set vertically in its stand, the Mystique occupies exactly 3 inches of horizontal desk space.

The Akia's 14.5-inch-diagonal LCD screen is equally streamlined, measuring merely 8 inches tall. It supports resolutions up to 1024 by 768 and has an RGB interface, so you can connect it to other devices. It comes with Windows 95 but no other software; the Hitachi comes with Win 95 or NT.

HITACHI'S ALL-IN-ONE VISION

HITACHI's VisionDesk seamlessly integrates a PC onto the back of an LCD panel, which sits atop a footed pedestal. All told, the unit takes up less desk space than the average 17-inch monitor without a system unit. A handle on the back makes it easy to move between rooms.

You access the VisionDesk's floppy drive and 12X–20X CD-ROM drive from the front, right below the 13.3-inch LCD—an effective arrangement. Don't let the simplicity of the design fool you, though: This is a sophisticated system. The configuration resembles the Akia's but comes with a smaller display. Hitachi also includes a 56-kilobits-per-second modem and a faster 12X–20X CD-ROM drive.

One other point to consider: If the Hitachi's LCD panel fails, you're stuck until it's fixed: It has no connector for an external monitor.

Overall, I liked the Akia Mystique M233 best, but you'll need to go with your own tastes. Put either of these systems on your desk, and the boxy PCs of the past will look square indeed.

—Susan Silvius

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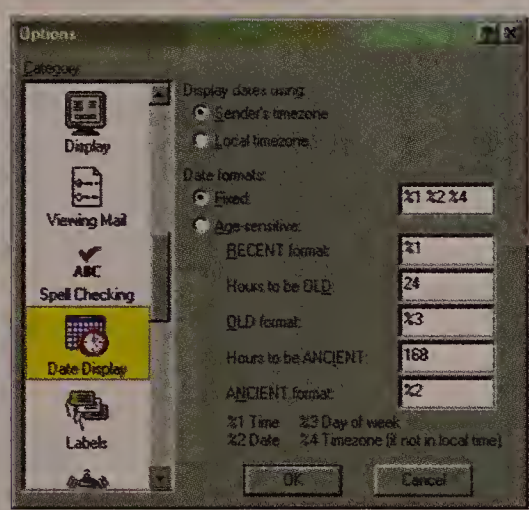
Eudora Pro 4.0: E-Mail Favorite Falls Short

E-MAIL

I HAVE JUST ONE thing to say to the talented folks at Qualcomm regarding **Eudora Pro 4.0:** Go back to the drawing board, please. This veteran e-mail package has won our praise in the past for its functionality, but the newest version is far too difficult to use. There are plenty of other choices available, and this product won't work for the millions of people who want to send and receive e-mail without having to understand how it works.

The $39 Eudora Pro 4.0, which I tested in preproduction form, is targeted squarely at power users who are very technically oriented. (Qualcomm also plans to ship a free basic version later this year.)



EUDORA PRO 4.0's dialog boxes are hard for nontechies to navigate and understand.

The company tried to improve Eudora's usability—for example, a new "personality" setup wizard helps configure POP3 accounts—but overall the program is not intuitive.

For example, the Options menu presents many terms and acronyms that the average person will not understand. Under the Incoming Mail menu, there's an option called Authentication, for which you are supposed to select one of the following: APOP, Kerberos, Password, or RPA. Hmm...I'll take the middle one. Qualcomm needs to run Eudora Pro 4.0 through a geek-to-English translation and streamline its many menus.

The new version of Eudora Pro may win praise from the techie crowd for its comprehensive support for the latest open-messaging standards, such as LDAP, IMAP, and ACAP. But other people should instead consider either Microsoft's Outlook Express package, which comes with Internet Explorer 4.0, or Netscape Messenger, which comes with Communicator 4.0. Better yet, check out Netaddress (www.netaddress.com), a free Web-based e-mail service with a smart but simple interface.

—Yael Li-Ron ▶

EDITED BY
Yardena Arar and Laurianne McLaughlin

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Eudora Pro 4.0

PRO: Sophisticated POP3 e-mail functions.

CON: Interface is highly complex and intimidating.

VALUE: Appropriate only for people who speak geek.

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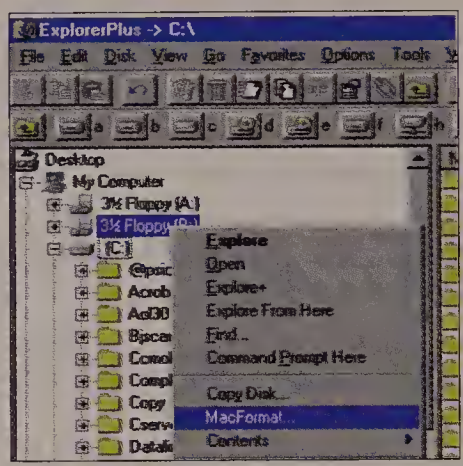
UTILITY

I NEEDED HELP: My e-mail was hexed. No, not voodoo cursed. *Hexed.* Maybe you've received some of the same kinds of messages, which encounter problems somewhere between the sender and recipient and become a digitally encoded mishmash of numbers and letters. I needed a utility that could translate these messages and any attachments. (And I didn't want to download a bunch of converters for the multitude of encoding formats on the Internet.) I tested shipping copies of two file-viewer/conversion packages—DataViz's $99 **Conversions Plus 4.0** and Verity's $49 **KeyView Pro 6.0**—and both handled the job well.

These indispensable utilities also let you view and convert files created in hundreds of popular applications, from Microsoft Office to graphics packages, and both integrate with Windows 95's Explorer. Overall, KeyView Pro is a bit faster and simpler to use with e-mail, but Conversions Plus offers valuable Macintosh formatting abilities.



MAC ATTACK: Conversions Plus is a handy tool for reading Macintosh files.

OPEN SESAME

KEYVIEW PRO 6.0 works in the background. When you click on a file name, the utility takes a quick peek at your PC. If the file's originating program is not installed, KeyView takes over and opens it. You can also print multiple files either directly from Explorer or without opening or viewing them. The program handles common compressed file formats as well.

Of course, KeyView Pro can't convert every application format. But it supports many current formats, including Corel WordPerfect 8.0, Lotus Word Pro 96 and 97, Microsoft Word 97, Corel Quattro Pro 8.0, Lotus 1-2-3 96 and 97, and Microsoft Excel 97. KeyView Pro works with older and newer Web browsers and e-mail packages. Overall, the instant-reading features alone make this utility worth the price.

MAC TRICKS

AS ITS NAME implies, DataViz's Conversions Plus 4.0 is best at converting files, though it also lets you view files by right-clicking the file name in Windows' Explorer, selecting the Conversions Plus menu choice, then selecting View. (Like I said, it's best for converting but not for instant viewing.)

Note that Conversions Plus also has DataViz's MacOpener and E-ttachment Opener utilities built in. So not only does it handle seemingly every PC file format, but it also lets you read files on Mac-formatted floppies and CD-ROMs and can even format floppies in Mac format right from your PC. The E-ttachment Opener utility unhexed my e-mail, then converted the attachment.

Because it has the more versatile Mac tools, I prefer Conversions Plus. But with KeyView Pro, instant viewing of PC files was quicker and unencoding e-mail was simpler. If those are your main needs, KeyView Pro is a good value.

—*Michael S. Lasky* ▶

Conversions Plus 4.0

PRO: Handles many different e-mail and file formats.

CON: Viewing files is an awkward, multistep process.

VALUE: Macintosh-to-PC features make it valuable.

DataViz
800/733-0030
www.dataviz.com
Street price: $99

READER SERVICE NO. 722

KeyView Pro 6.0

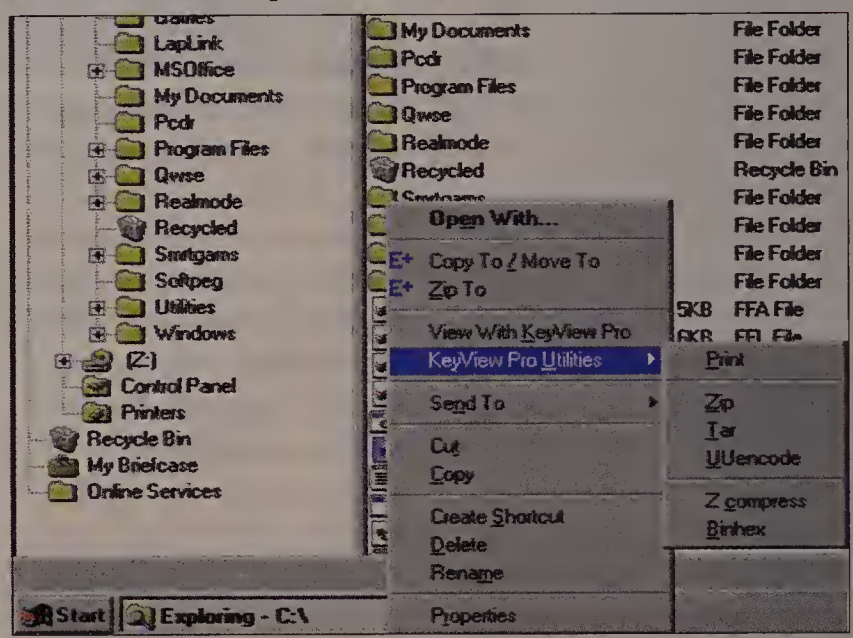
PRO: Seamless file viewing, easily opens e-mail and attachments.

CON: Doesn't handle Mac formats.

VALUE: For file viewing and instant printing functions alone, it's worth the price.

Verity (distributed in retail stores by Kiss Software)
408/541-1500
www.keyview.com
Street price: $49

READER SERVICE NO. 723



YES, WE'RE OPEN: KeyView Pro 6.0 allows you to open compressed .zip files, encoded e-mail, and files from popular office applications.

QUICK TAKES

Improved Peachtree Accounting

Just in time for postholiday small-business bookkeeping comes an upgrade of Peachtree Accounting, the veteran accounting program for basic budgeting, invoicing, and payroll. At $129, version 5.0 has new navigational aids and a more colorful interface. There's also a new tool for viewing background calculations, and an automatic conversion feature for importing data from competitors such as Intuit's Quicken. You'll also find 16 added reports and new sales-order tracking features. The upgrade for existing users costs $79. Peachtree says that in 1998 it will also update First Accounting ($69), Complete Accounting ($199), and Complete Accounting Plus Time & Billing ($249). Peachtree Software; 800/228-0068; www.peachtree.com

READER SERVICE NO. 724

—*Karen Silver*

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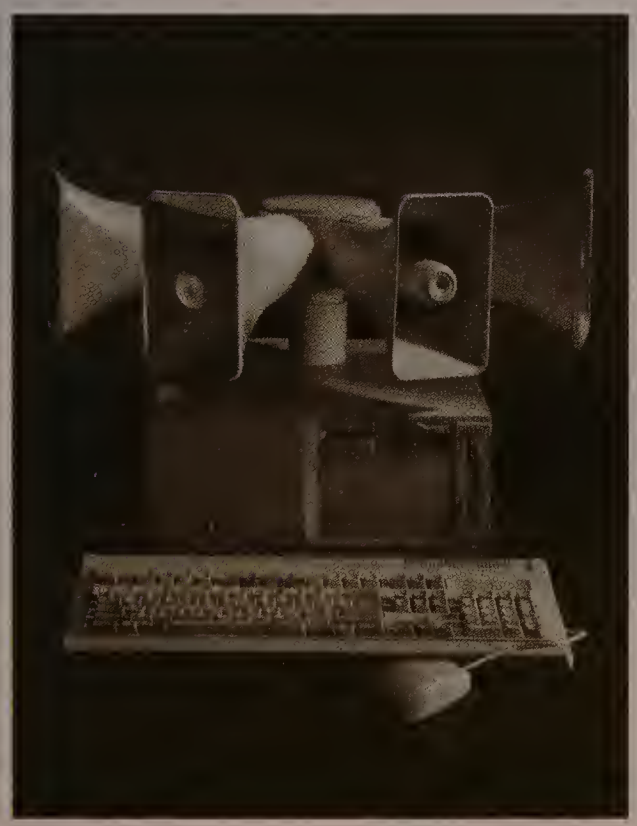

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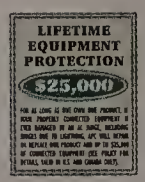

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Circle 45 on reader service card

$99 Color Flatbed Scanners: Storm vs. Plustek

SCANNER

IF YOU'VE BEEN shopping for a scanner, you know that prices have been plummeting for months. How low can they go? As low as $99 for new color flatbed models from Plustek USA and Storm Technology. These basic scanners provide a real value for people who want to scan books, magazines, and heavy papers, as well as single sheets of paper. Thanks to its software, the Storm unit is the best choice, especially for novices.

Street priced at $99, Plustek's **OpticPro 600P** is the most inexpensive color flatbed scanner to date; Storm's **EasyPhoto ImageWave** costs $149 but comes with a $50 rebate offer until January 31, 1998. These scanners deliver 30-bit color and 300-by-600-dots-per-inch optical resolution. Both install easily via the parallel port (with pass-through adapters for connecting your printer). They also have removable lids for scanning bound volumes, with a maximum scan area of 8.5 by 11.7 inches. As for desk space, the OpticPro's footprint measures about 11 by 17 inches, while the Storm's is 11.5 by 16 inches.

Overall, in my tests of shipping units I found that both scanners worked capably for general home or business use. The big difference between the two is the software bundle. The OpticPro comes with Micrografx's PhotoMagic image editing software and a basic version of ExperVision's TypeReader optical character recognition package—neither of which is easy to master.

The Storm ImageWave's software bundle is luxurious by comparison. The company's EasyPhoto software makes image scanning simple; for more advanced work, you can use the included copy of Adobe PhotoDeluxe 2.0. The limited version of Xerox's TextBridge OCR software is much easier to use than TypeReader, and DocuMagix PaperMaster gives you document management features that Plustek ignored.

—*Yardena Arar*

EasyPhoto ImageWave

PRO: Exceptionally easy to use, good software bundle.

CON: More expensive after January 31, 1998.

VALUE: A solid bargain while the January rebate lasts.

Storm Technology
888/438-3279
www.stormtech.com
Street price: $149 ($50 rebate through January 31)

READER SERVICE NO. 725

OpticPro 600P

PRO: Inexpensive and capable.

CON: Unfriendly software, doesn't come with a document management program.

VALUE: Not the best, but not bad for $99.

Plustek USA
800/685-8088
www.plustek.com
Street price: $99

READER SERVICE NO. 726

Laser Tag: Lexmark Optras Chase HP's Prices

PRINTER

LEXMARK LIKES to cook up network laser printers that are lower-priced than the competing Hewlett-Packard products, and you'll like its latest examples. Lexmark's new 16-pages-per-minute **Optra S 1620** sells for $999; its 24-ppm sibling, the Optra S 2420, goes for $1899. By comparison, HP's new 17-ppm LaserJet 4000 series starts at $1099 (see Top 10 Printers, January), and the older, hugely popular 24-ppm HP LaserJet 5si costs $2399.

The only hitch: The Optra S 1620 doesn't quite match the LaserJet 4000 line in speed. In our tests of a shipping unit, the Optra S 1620 ran about 1 ppm slower than the LaserJet on graphics, and nearly a full page slower for text jobs. Yet overall it's still a fairly fast workgroup printer and a good value. You'd pay $999 for IBM's Network Printer 12 laser, which at 12 ppm for text is slower than the Lexmark.

In its default mode, the Optra S 1620 offers clean text and crisp but slightly dark graphics, particularly with photographs; these results are similar to those of the LaserJet 4000 line. Both new Optra models also have two 1200-dpi modes, as do the HP counterparts. The Optras' first mode, called "1200 image quality," prints dusky graphics at the rated speed, while their true 1200-dpi mode prints brighter graphics half as fast.

THE NEW DEAL: Lexmark's Optra S 1620 offers good print quality and is easy to use.

Lexmark loves paper-handling options: Both models accept optional input trays for 200, 500, or 2000 sheets in addition to the standard 350-sheet tray, plus a duplexer and an 85-envelope feeder.

I found the Optra S 1620 easy to use. The printer's software installs smoothly, the control panel is a breeze to work with, toner cartridges pop right in, and the printer itself is sturdy and elegant. Lexmark's manual is detailed, though it covers a lot of models.

Overall, the new Optras do well on price and print quality.

—*Karen Silver* ▶

Optra S 1620

PRO: Inexpensive, good output quality.

CON: Some images print a bit dark, documentation is not perfect.

VALUE: A quick, high-quality laser for under $1000.

Lexmark Int'l
800/539-6275
www.lexmark.com
Street price: $999

READER SERVICE NO. 727

13.3" Active-Matrix TFT Color Display

Provides a 21% larger viewing area than 12.1" displays. And with 1024 x 768 high resolution, even the most intricate images look razor sharp.

233MHz Pentium® Processor With MMX™ Technology

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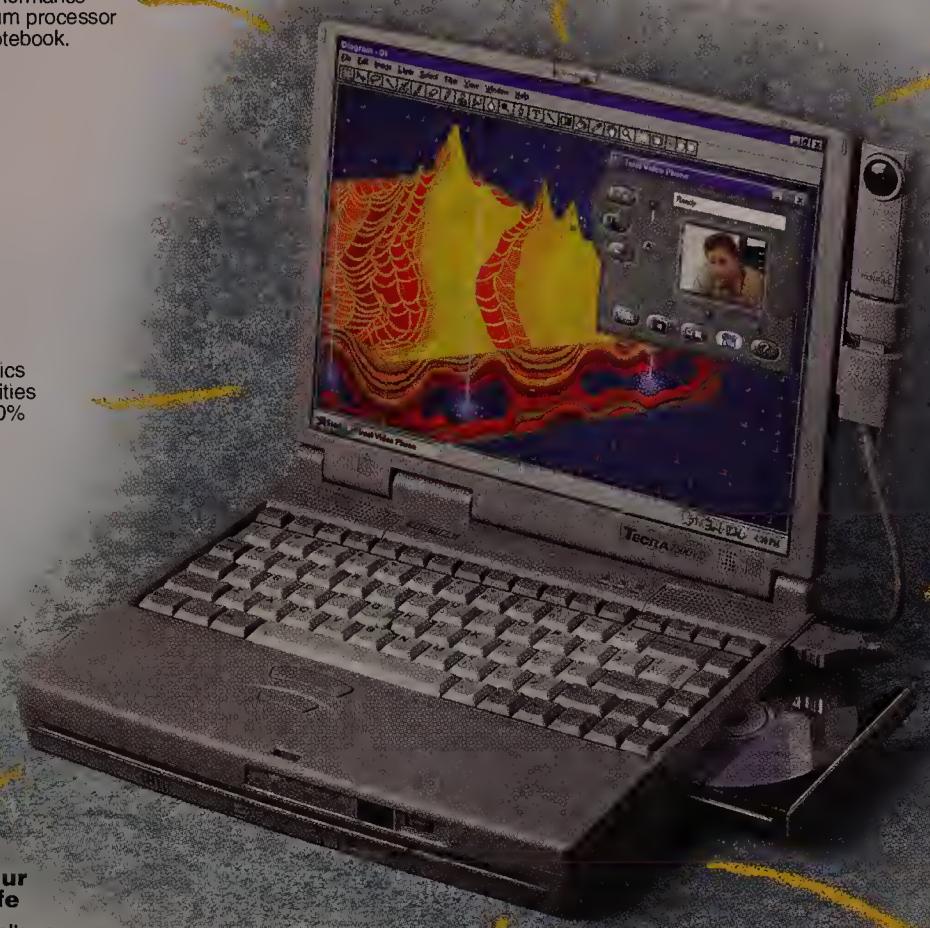
Integrated digital camera for capture of live video and video conferencing. New VideoBrush™ software allows you to digitally scan images, documents and whiteboards.



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- DVD-Video playback* up to 15.9GB of DVD-ROM storage, CD-R compatible

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Circle 228 on reader service card

Visto Briefcase: Store Files on the Web

UTILITY

ALWAYS ON THE move? Consider adding **Visto Briefcase**—a subscription-based service for retrieving your PC files, bookmarks, and e-mail from anywhere over the Internet—to your travel wardrobe. The Briefcase service works by automatically replicating files from your PC, encrypting them, and uploading them to a secure Visto server at predetermined times (up to twice a day). You can then access those files from any computer using a Java-enabled browser and your password. Visto lets you synchronize any number of PCs, and it automatically saves the latest version of a document to all computers. Pricing for the service wasn't final at press time; it is expected to be $19.95 per month.

So, for example, you could read and reply to your e-mail from a set-top device in a hotel room, or even download and print files from a public Internet terminal in an airport.

The Briefcase system has great potential, but it suffers from a few limitations. The replicator can grab e-mail as often as every 15 minutes, but it works only with POP3 e-mail accounts, so you can't use it with some of today's proprietary systems like America Online and Lotus Notes. Also, with e-mail services from sites like HotMail and Yahoo, accessible Web-based e-mail is already easy and free.

When I tested a preproduction version of Briefcase, Visto hadn't yet implemented support for synchronization of contact managers or personal information managers—probably the most important data you'd want to access remotely. Visto says that it plans to add support for leading contact managers and e-mail clients by the time the product ships.

Overall, the Visto Assistant interface is very intuitive, and its updating mechanisms were faultless. Security functions look good, incorporating digital certificates for authentication, as well as industry-standard Secure Sockets Layer encryption. Briefcase is definitely an option to watch.

—Glenn McDonald

Visto Briefcase

PRO: Easy remote access to your PC files via the Web.

CON: Limited access to some e-mail programs.

VALUE: At first look, it's a winner.

Visto

650/961-2400

www.visto.com

List price: $19.95 per month

READER SERVICE NO. 728

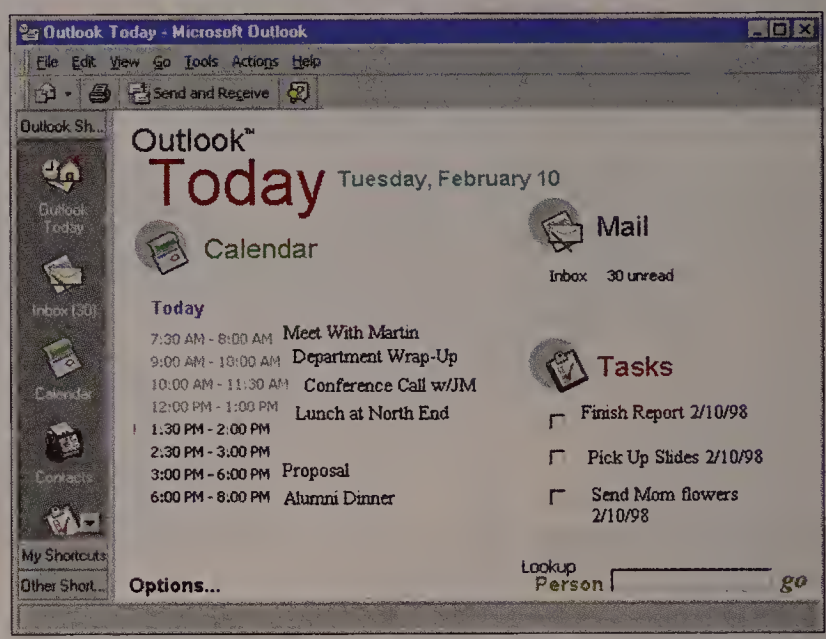
Microsoft Outlook 98: Smart Improvements

PRODUCTIVITY

YOU'LL SEE AN improvement the first time you load **Microsoft Outlook 98,** a free upgrade to Microsoft Office's combination personal information manager, group scheduler, and e-mail program. A new view provides you with a snapshot of what's on your plate: lists of the day's appointments, unread e-mail, and unfinished tasks. For this reason alone, the upgrade is worth installing. I tested a preproduction version.

Microsoft plans to make the Outlook 98 upgrade available before March, and free to anyone who has Office 97, Microsoft Exchange 5, or Outlook 97. At press time Microsoft said that Outlook 98 would also be sold as a stand-alone program but hadn't set the price.

As an e-mail program, Outlook 98 is as good as they come. You can format your messages, which are sent over the Internet in HTML, the format used by Netscape Messenger and Outlook Express. The program now lets you create multiple signatures and insert the one you want into a new message.



SEE YOUR DAY: Microsoft's Outlook 98 opens with a new overview of what you need to get done. Overall, this Outlook is positive.

Outlook 98 also allows you to set up online meetings. At the scheduled time, the program launches NetMeeting, Microsoft's free Internet phone/collaboration tool; it contacts your coworkers through the Net or your local area network. Together you can share files, paste copy on a whiteboard, do a text chat, or (with the right hardware) talk.

But as a contact manager, Outlook 98 is still complex and set in its ways. For instance, you can redesign the contact forms with an artist's precision, but there's no easy way to simply add a field. Still, the new Outlook is now more than just an Office also-ran.

—Lincoln Spector ▶

Outlook 98

PRO: Great e-mail functions, NetMeeting integration.

CON: Contact forms are difficult to customize.

VALUE: A terrific free upgrade.

Microsoft

800/426-9400

www.microsoft.com/outlook

Street price: free for existing Office 97 users, price for stand-alone version unavailable

READER SERVICE NO. 729

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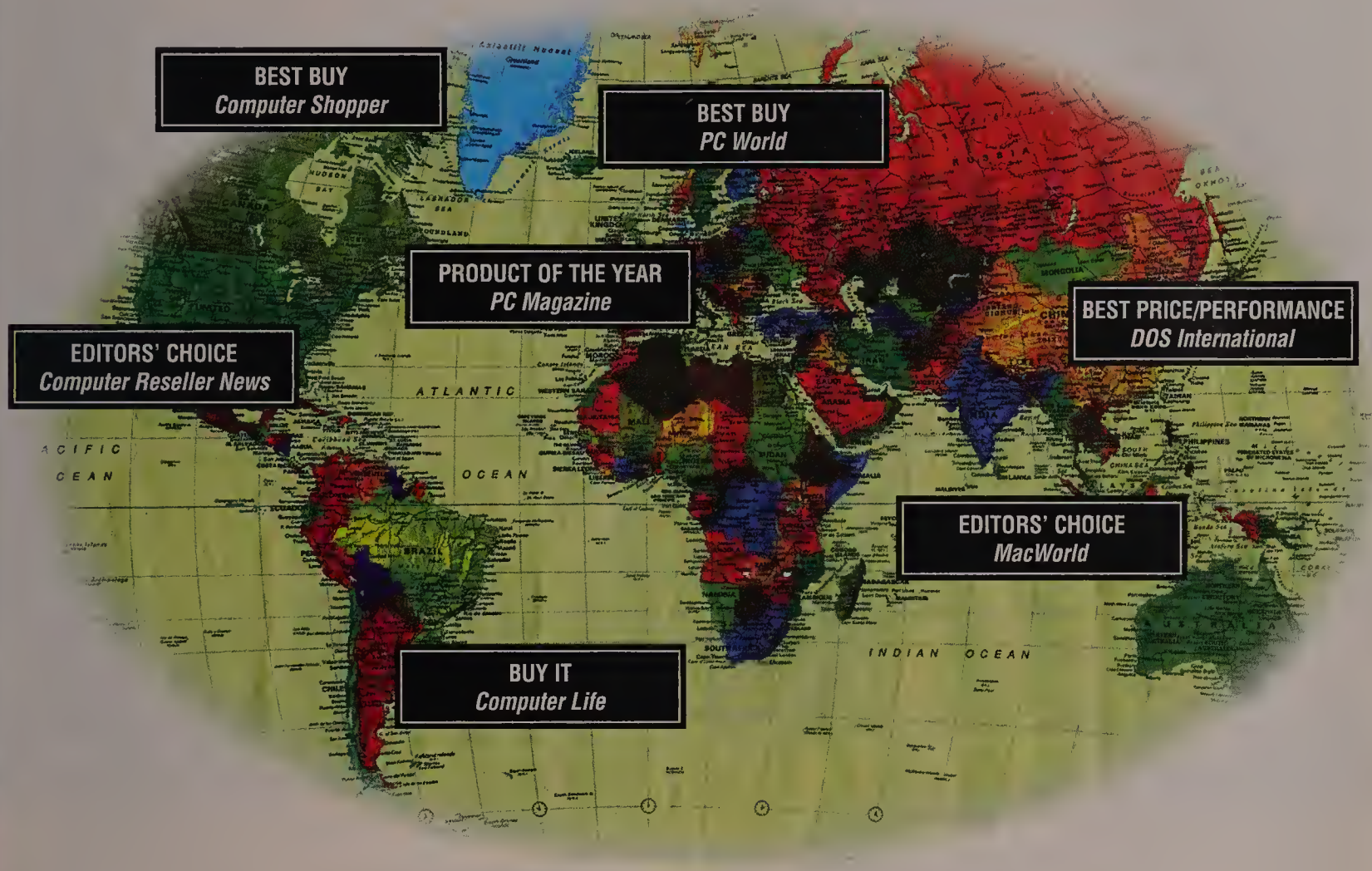

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Model/ Viewable Area	Dot Pitch Horiz. Scan	Max. Horiz. Scan Rate	Refresh Rate	ESP
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17" MT-9017E (16" vis)	.25mm Aperture Grille	92 kHz	72 Hz (1600 x 1200)	$669

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Circle 108 on reader service card

Sleek Solo 5100 XL Has Big Screen, Small Price

NOTEBOOK

IN A NOTEBOOK design, sleek beats chunky any day—we'd all like to slip a portable PC into a briefcase rather than hauling it in a separate bag. But until now the sleekest ultrathin notebooks, measuring 1 inch thick or less, have been priced for the CEO set.

Even with a big, bright 14-inch active-matrix display, Gateway 2000's new **Solo 5100 XL** is more affordable than its peers. I used a preproduction version of the $4499 XL with a Pentium MMX-233 processor, a hefty 48MB of RAM, a 4GB hard disk, an 8X–18X CD-ROM drive, and a 56-kbps x2 PC Card modem. You won't find another 6-pound portable with these goodies at this price.

Want to spend a bit less? Gateway offers a basic Solo 5100 model with a P-133 chip for $3099, or with a PMMX-200 for $3949. By comparison, Digital's HiNote Ultra 2000, a very thin 5-pound notebook with a 14.1-inch screen, costs $4999—and its PMMX-166 processor is much less powerful than the Solo XL's. IBM's ultrathin ThinkPad 560X has a PMMX-233 chip and a 4GB hard drive, but only 32MB of RAM and a 12-inch screen—and it's $4299.

At press time the Solo 5100 XL wasn't ready for formal benchmark testing, but its convenience factor and display quality won me over quickly. It takes up about the same space in my briefcase as two issues of *PC World*. It has a roomy keyboard, with touchpad and palm rest below, plus a built-in floppy drive. (You must swap in the CD-ROM drive.) The lithium ion battery lasted about 2 hours when I used it with applications like Microsoft Word and Excel. Keep in mind that the big display drains the battery quickly.

Gateway includes an unusually luxurious Samsonite carrying case and bundles Microsoft Office 97 Small Business Edition. I'd like this notebook even better if its AC adapter were a little smaller; it takes about as much space as an external mouse. But overall, the Solo 5100 XL's price and big display make it well worth considering.

—*Laurianne McLaughlin*

Solo 5100 XL

PRO: Beautiful 14-inch screen, reasonable price.

CON: AC adapter could be a bit smaller.

VALUE: Thin notebook more affordable than most.

Gateway 2000
800/315-2356
www.gateway.com
Street price: $4499 (basic models start at $3099)

READER SERVICE NO. 730

QUICK TAKES

Boot From Zip Drive

IOMEGA ZIP drives are popular because they connect easily to a PC's parallel port and store 100MB of data on small disks. But wouldn't it be great if you could boot from an external Zip drive just as you can from a PC's floppy drive? You could start up your machine with different operating systems, or with applications that you don't want on your hard drive. With Blue Sky Innovations' ZppA Card, you can make a parallel port Zip drive your default A: drive. This $40 add-on card plugs into an empty ISA slot and works in concert with the system BIOS. The card works best with Windows 95 OSR2 or later. It allows boot-ups from the Zip drive on systems with DOS and earlier Win 95 versions, but you may be able to access only 32MB of data on a Zip disk, the company says. Blue Sky Innovations; 408/605-1619; www.blueskyinnovations.com.

READER SERVICE NO. 732

—*Michael S. Lasky*

AlphaSmart 2000: Keyboard With Memory

KEYBOARD

HERE'S A GOOD definition of overkill: buying a notebook or home PC to work on simple word processing documents outside your office. If all you want to do is tap out notes or memos, you don't need a powerhouse system. In fact, with Intelligent Peripheral Devices' **AlphaSmart 2000** keyboard, you don't need a PC at all. I tested a shipping version.

It's easy to see that the $249 AlphaSmart 2000 is no ordinary keyboard. It has a 40-character-by-4-line LCD and 128KB of memory, which lets you disconnect the 2-pound device and do basic word processing just about anywhere. To transfer a document to a PC, you reattach the keyboard, launch the word processor, and press the AlphaSmart's Send key. An optional $19 utility also lets you send files from PC to keyboard.

DOUBLE DUTY: The AlphaSmart 2000 saves documents and handles basic word processing.

The AlphaSmart is an intriguing invention but not a satisfying substitute for a regular keyboard. Some of its keys live in odd places—<Esc> is to the right of the space bar—and it lacks a numeric keypad. Also, some standard tasks like <Page Up> and <Page Down> require key combinations.

—*Harry McCracken* ▶

AlphaSmart 2000

PRO: Inexpensive and portable gadget for basic word processing.

CON: Unusual key placement, some software costs extra.

VALUE: Clever but not perfect for work on the go.

Intelligent Peripheral Devices
408/252-9400
www.alphasmart.com
Street price: $249

READER SERVICE NO. 731

Its technology is so far ahead, its price hasn't caught up with it yet.

[System shown with optional NEC C700 17" Monitor (16" viewable) and Iomega® Zip Drive]

BUILT TO ORDER

The NEC Direction at $2199.

The cutting edge. The latest and the greatest. Whatever you call the hottest technology, it's all here. And better yet, it's all fast. A 300MHz Intel Pentium II processor, 32 megs of SDRAM (high speed memory that dusts anything that has come before it). There's also a scintillating boost for all your 2D and 3D applications called Accelerated Graphics Port video. We've even turbocharged the data transfer capability by adding a 4.3 gig Ultra DMA hard drive. The NEC Direction PC. The computer of the future at a price from the past. So call now. After all, there's no time like the present.

NEC NOW

MMX™ intel inside pentium® II PROCESSOR

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- **300MHz Pentium® II processor featuring MMX™ technology**
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- Microsoft IntelliMouse®
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* Upgrade to Yamaha Wavetable Audio, add $49
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NEC

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Direction SPL300

- **300MHz Pentium® II processor featuring MMX™ technology**
- **128MB SDRAM Memory**
- **8.4GB Ultra DMA Hard Drive**
- NEC LCD2000™ 20.1" Flat Panel Display (20.1" viewable)
- Number Nine Revolution 3D AGP, 8MB WRAM Video Card
- Altec® Lansing ACS-410 Speakers with Dolby® Pro-Logic Circuitry and ACS-251 Subwoofer
- Yamaha Wavetable Audio
- Iomega 100MB Internal Zip Drive with One Cartridge
- DVD-ROM Drive
- Microsoft SideWinder® 3D Pro Joystick
- Microsoft Flight Simulator 98
- Microsoft Championship Auto Racing Teams (CART)
- DirecPC™ Satellite

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Leasing Available Code #D5050

Direction SPL300

- **300MHz Pentium II processor featuring MMX technology**
- **32MB SDRAM Memory**
- **4.3GB Ultra DMA Hard Drive**
- NEC C700 17" Monitor (16" viewable)
- Diamond Viper® AGP, 4MB SGRAM Video Card
- Altec Lansing ACS-90 Speakers
- Microsoft SideWinder 3D Pro Joystick
- Microsoft Flight Simulator 98
- Microsoft Championship Auto Racing Teams (CART)

* Upgrade to 64MB SDRAM Memory, add $129
* Upgrade to 6.4GB Ultra DMA Hard Drive, add $99
* Upgrade to DVD-ROM (replaces CD-ROM), add $279
* Iomega 100MB Internal Zip Drive with One Cartridge, add $99

$2499
Consumer Lease: $99/mo. Code #D5054

Direction SPL300

- **300MHz Pentium II processor featuring MMX technology**
- **32MB SDRAM Memory**
- **4.3GB Ultra DMA Hard Drive**
- NEC C550 15" Monitor (14" viewable)
- Diamond Viper AGP, 4MB SGRAM Video Card
- Altec Lansing ACS-90 Speakers

* Upgrade to 64MB SDRAM Memory, add $129
* Upgrade to 6.4GB Ultra DMA Hard Drive, add $99
* Upgrade to NEC C700 17" Monitor (16" viewable), add $219
* Upgrade to Yamaha Wavetable Audio, add $49
* Upgrade to Altec Lansing ACS-45 Speakers with Subwoofer, add $39

$2199
Consumer Lease: $87/mo. Code #D505

Direction Add Ons:

* Upgrade Memory from 32MB SDRAM to 64MB SDRAM, add $129
* Upgrade from NEC C550™ 15" Monitor (14" viewable) to NEC C700™ 17" Monitor (16" viewable), add $219
* Iomega® 100MB Internal Zip Drive with One Cartridge, add $99

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Workgroup servers designed to grow with your business.

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- 3-Year On-Site Service Warranty

* 2nd Pentium II processor, add $1499
* 64MB of ECC Memory, add $449
* PCI Ultra Wide SCSI RAID Controller, add $1149
* 2/4/9GB Ultra Wide SCSI Disk Drives for up to 36GB of Storage Space, add $529/$699/$1099

$3669
Bus. Lease: $132/mo. Code #E6208

Express5800 ES1200

- **233MHz Pentium II processor,** 512KB L2 ECC Cache
- **32MB ECC DIMM Memory** (512MB max)
- **4GB EIDE Hard Drive**
- PCI 10/100 Network Card
- 24X avg Variable Speed CD-ROM, 1.44MB Floppy Drive
- 4 PCI, 2 ISA I/O Slots
- 7 Drive Bays; 1 External 3.5", 3 External 5.25" & 3 Internal 3.5"
- ESMPRO Server Management Suite
- 3-Year On-Site Service Warranty

* 32MB of ECC Memory, add $189
* PCI Ultra Wide SCSI RAID Controller, add $1059
* 4/6GB EIDE Disk Drives for up to 18GB of Storage Space, add $299/$429
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$2249
Bus. Lease: $83/mo. Code #E6701

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* NEC Xircom® 10/100 CardBus Network Card, add $159
* Spare AC Adapter, add $89
* PowerXtender™ Airplane and Auto Adapter, add $89

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MMX™ intel inside pentium® II processor

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Direction SPL266

MHz Pentium II processor
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MB SDRAM Memory
GB Ultra DMA Hard Drive
C C550 15" Monitor (14" viewable)
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B SGRAM Video Card
ec Lansing ACS-90 Speakers
grade to 64MB SDRAM Memory,
$129
grade to 6.4GB Ultra DMA Hard
ve, add $99
grade to NEC C700 17" Monitor
" viewable), add $219
nega 100MB Internal Zip Drive
h One Cartridge, add $99

$1999
umer Lease: $79/mo. Code #D5056

Direction SPL233

- **233MHz Pentium II processor featuring MMX technology**
- **32MB SDRAM Memory**
- **3.2GB Ultra DMA Hard Drive**
- NEC C550 15" Monitor (14" viewable)
- Number Nine Reality 334 PCI, 4MB SGRAM Video Card
- Altec Lansing ACS-90 Speakers
- * Upgrade to 64MB SDRAM Memory, add $129
- * Upgrade to 4.3GB Ultra DMA Hard Drive, add $80
- * Upgrade to NEC C700 17" Monitor (16" viewable), add $219
- * Iomega 100MB Internal Zip Drive with One Cartridge, add $99
- * Upgrade to Number Nine Revolution 3D PCI, 4MB WRAM Video Card, add $149
- * Upgrade to Altec Lansing ACS-45 Speakers with Subwoofer, add $39

$1699
Consumer Lease: $67/mo. Code #D5057

NEC Direction Business Series Desktops

Common Features: Minitower or Desktop Tool-Less Chassis • 512KB L2 Cache • 24X max Variable Speed CD-ROM • 3.5" Floppy Drive • 2 Universal Serial Bus (USB) Ports • Integrated Yamaha Sound • **U.S. Robotics x2 56Kbps* Capable Modem** • Microsoft Windows 95 • Microsoft Office 97 Small Business Edition • Microphone • Microsoft IntelliMouse • Palmrest Keyboard • 3-Year Limited Warranty with 1-Year On-Site Service

Direction SPL300

- **300MHz Pentium II processor featuring MMX technology**
- **64MB SDRAM Memory**
- **8.4GB Ultra DMA Hard Drive**
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- Number Nine Revolution 3D AGP, 4MB WRAM Video Card
- Altec Lansing ACS-90 Speakers
- Select either U.S. Robotics x2 56Kbps* Capable Modem or 3Com 3C905 10/100 PCI Network Card
- * Upgrade to Microsoft Windows NT® 4.0, add $90
- * Iomega 100MB Internal Zip Drive with One Cartridge, add $99
- * Upgrade to DVD-ROM (replaces CD-ROM), add $279

$2999
Bus. Lease: $111/mo. Code #D5051

Direction SPL266

- **266MHz Pentium II processor featuring MMX technology**
- **64MB SDRAM Memory**
- **6.4GB Ultra DMA Hard Drive**
- NEC C700 17" Monitor (16" viewable)
- Number Nine Revolution 3D AGP, 8MB WRAM Video Card
- Altec Lansing ACS-45 Speakers with Subwoofer
- Yamaha Wavetable Audio
- * Upgrade to 8.4GB Ultra DMA Hard Drive, add $89
- * Iomega 100MB Internal Zip Drive with One Cartridge, add $99
- * Upgrade to Altec Lansing ACS-410 Speakers with Dolby Pro-Logic Circuitry and ACS-251 Subwoofer, add $69

$2799
Bus. Lease: $104/mo. Code #D5058

NEC Versa® 6000 Series Notebooks

The ultimate power notebook.

mon Features: PC 97 Compliant • DMI 2.0 Compliant • PCI Bus Architecture • Magic 128-bit Graphics Accelerator with 2MB VRAM • Full Motion, Full Screen G-1 Video • 32-bit CardBus Support • Zoomed Video Support • USB Port • 4Mbps Infrared Port • Integrated 16-bit Stereo Sound with 3D Spatializer Technology • um Ion Battery • Full Docking Capability • Microsoft Windows 95 • Microsoft ows NT Workstation 4.0 Capable • 1-Year Free UltraCare℠ Service with Option grade

Versa 6230

3MHz Pentium processor with MX technology
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2KB L2 Pipeline Burst Cache
GB Hard Drive
dular VersaBay™ II Accepts 20X
x Variable Speed CD-ROM, 1.44MB
ppy Drive (both included) or
ional 2nd Lithium Ion Battery
rsa Docking Station 6000 Plus,
$869
Lithium Ion Battery, add $189
crosoft Windows NT Workstation
, add $99
grade to UltraCare Extended Service,
$99

$3899
Lease: $140/mo. Code #V6231

Versa 6060

- **166MHz Pentium processor with MMX technology**
- 12.1" SVGA Active Matrix TFT Display
- **32MB EDO DRAM (128MB max)**
- 256KB L2 Pipeline Burst Cache
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- Modular VersaBay II Accepts 20X max Variable Speed CD-ROM, 1.44MB Floppy Drive (both included) or Optional 2nd Lithium Ion Battery
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- * VersaPro™ Ballistic Nylon Multipurpose Carrying Case, add $89
- * Versa MiniDock™ 6000, add $499
- * U.S. Robotics x2 XJACK® 56Kbps* Capable Modem, add $159

$3299
Bus. Lease: $122/mo. Code #V6063

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All-in-one convenience at a sensible price.

Common Features: PC 97 Compliant • DMI 2.0 Compliant • PCI Bus Architecture • NeoMagic 128-bit Graphics Accelerator with 2MB VRAM • Full Motion, Full Screen MPEG-1 Video • 32-bit CardBus Support • Zoomed Video Support • USB Port • 4Mbps Fast Infrared Port • Stereo Speakers and Subwoofer with 3D Surround Sound and Yamaha Software Wavetable • Microsoft Windows 95 and Microsoft Internet Explorer 4.0 • 1-Year Free UltraCare Service with Option to Upgrade

Versa 2785MT

- **233MHz Pentium processor with MMX technology**
- 12.1" SVGA Active Matrix TFT Display
- **16MB EDO DRAM (128MB max)**
- 512KB L2 Pipeline Burst Cache
- **Built-in 2.1GB Hard Drive**, 20X max Variable Speed CD-ROM, 1.44MB Floppy Drive, and Lithium Ion Battery
- **Integrated 56Kbps* Capable Modem**
- **Microsoft IntelliMouse**
- * Upgrade to 32MB RAM, add $159
- * NEC Xircom 10Base-T Network Card, add $99
- * Lithium Ion Battery, add $199

$3099
Bus. Lease: $115/mo. Code #V2715

Versa 2765MT

- **166MHz Pentium processor with MMX technology**
- 12.1" SVGA Active Matrix TFT Display
- **16MB EDO DRAM (128MB max)**
- 256KB L2 Pipeline Burst Cache
- **Built-in 2.1GB Hard Drive**, 16X max Variable Speed CD-ROM, 1.44MB Floppy Drive, and Lithium Ion Battery
- **Integrated 56Kbps* Capable Modem**
- **Microsoft IntelliMouse**
- * Upgrade to 32MB RAM, add $159
- * Versa PortBar™ 2700 Port Replicator, add $159
- * Upgrade to UltraCare Extended Service, add $199

$2799
Bus. Lease: $104/mo. Code #V2714

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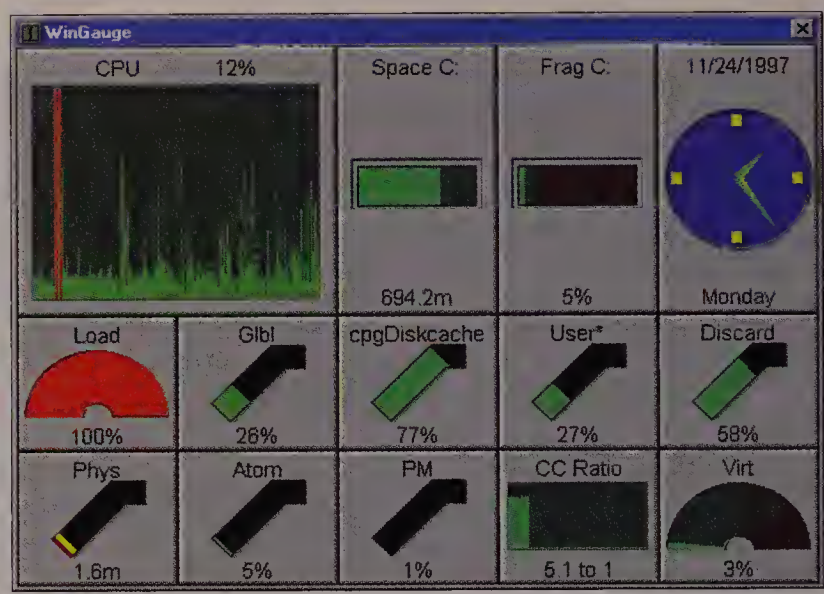
Hurricane 98: Speed Up Windows 95

UTILITY

HELIX SOFTWARE uses the same advertising lingo as other makers of performance-enhancement software, tossing around phrases like "up to 2000 percent this" and "as much as 300 percent that" to describe its $40 **Hurricane 98** utility. But with this or any similar program, results vary greatly depending on your PC and your work habits. However, based on my tests of a preproduction copy, Hurricane 98 can meaningfully improve Windows 95 performance.



TAKE CHARGE: Hurricane 98 improved Windows 95's performance in our tests; the utility's WinGauge helps you track progress.

Helix says that Hurricane 98 can speed up Windows 3.1 systems that have as little as 4MB of RAM, but it most benefits Windows 95 machines with at least 32MB of memory. Hurricane's mission is to accelerate booting, application launching and relaunching, printing, disk caching, and drive access. It does all of this using a group of task-specific caches that feed data to Windows quickly. For example, if you're always searching a network directory, Hurricane will cache it on your hard drive.

I timed common Windows 95 tasks on a 32MB Pentium-133 system—with and without Hurricane 98. It cut my average boot time by only a fraction of a second; Helix suggested that my empty Startup group left the program little data to cache. From launching and relaunching Excel 97 and Word 97, Hurricane cut more than a second off each task, and its Super Acceleration option cut another second per task. Hurricane also shaved seconds off printing and network searching. It makes activating the right caches easy.

Individually, saving a second or two isn't impressive. But when I use Hurricane 98—particularly in Word and Excel—certain windows *pop* open instead of oozing open. Also, you'll reap increasing benefits over time: The more tasks you repeat, the more information is cached, and the more time you save. Exactly how well it works depends on your work habits, your machine, and its Win 95 setup.

—*Shane Rau*

Hurricane 98

PRO: Speeds up many typical Windows 95 tasks.

CON: Benefits vary depending on your PC and work habits.

VALUE: Good enhancement utility for the price.

Helix Software

800/451-0551, 718/392-3100

www.helixsoftware.com

Street price: $40, upgrade from Hurricane 97 $20

READER SERVICE NO. 733

Point B: Faster File Downloads From a Server

UTILITY

IF YOU FREQUENTLY dial in to a company network to retrieve files, you know how slowly time can crawl. Traveling Software's **Point B Remote Net Accelerator** doesn't work miracles, but this utility could significantly speed up the task. I was pleasantly surprised by my tests of a shipping copy: If all conditions were right, Point B cut dial-up retrieval times from several minutes to a few seconds.

Point B makes clever use of disk caching—setting aside an area on your local PC's hard drive to store a copy of any file you retrieve over a dial-up connection. If you retrieve the same file in a later dial-up session, Point B compares it to the cached copy. If the cached copy is still current, the program retrieves the file locally. If the original file has changed, Point B retrieves only the changes via the dial-up link.

Point B also uses compression and link control. If you open or copy a server-based file while you're dialed in, the program tries to compress it before sending the file through the modem. This was especially useful when I accessed large files such as bitmapped images or documents with embedded graphics; in such cases, first-time retrievals were up to 40 percent faster. (But, Point B did not speed up first-time retrievals of small or average-size text files.)

Point B is easy to set up: The client software runs on Windows 95 and NT systems; the necessary server component runs on a LAN server or an NT workstation. Point B can retrieve files from any Novell NetWare or NT server and accepts connections through remote-access server products or modem servers.

—*Bill Lawrence* ▶

Point B Remote Net Accelerator

PRO: Reduces dial-up retrieval times for many files.

CON: Doesn't help with all apps.

VALUE: Great if you download frequently from a LAN.

Traveling Software

800/343-8080, 425/483-8088

www.travsoft.com

Street price: $999 for server and ten clients

READER SERVICE NO. 734

Take Friday off.

This wheel helps you work so quickly you just might. With the Microsoft® IntelliMouse®, you can roll through everyday tasks with a touch of your finger. Use the rubber wheel to AutoScroll through documents and Web pages faster. Use Data Zoom to navigate through Web hot links or through the Windows® 95 operating system. Whether you're in Office 97 or any other IntelliMouse compatible program, you'll be surprised by how fast you can work. So while we can't guarantee you'll get Friday off, we can promise you a better way to work.

And now, the IntelliMouse wheel is available on an ergonomically-designed trackball.

Microsoft IntelliMouse

Microsoft IntelliMouse TrackBall

Microsoft

Where do you want to go today?® www.microsoft.com/intellimouse

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Writing Class: Panasonic DVD-RAM Drive

DVD-RAM

THOUGH Panasonic's **LF-D101** DVD-RAM drive lets you store gobs of data on one low-cost disc, you may want to wait a bit until drive prices fall and industry standards for this rewritable medium are finalized.

THE NEW DVD: Panasonic's LF-D101 drive writes to 2.6GB and 5.2GB discs—but most consumers should wait until standards are ironed out.

LF-D101

PRO: Writes to low-cost media.

CON: Pricey, standards still in flux.

VALUE: New medium offers very affordable storage.

Panasonic

800/742-8086

www.panasonic.com

Street price: $799

READER SERVICE NO. 735

The $799 drive, expected to ship in January, wasn't ready for benchmark testing at press time. It reads various CD formats as well as DVD-ROM media, and writes to 2.6GB and 5.2GB DVD-RAM discs.

A clear strength is the price of media: A 2.6GB disc costs $24.95, and a 5.2GB disc is $39.95. If industry standards firm up later this year, DVD-RAM will make a lot of sense.

—Laurianne McLaughlin

QUICK TAKES

No-Nonsense Searches

MOST WEB search engines and directories are so plastered with ads and sideline enterprises like free e-mail and chat that they remind me of Times Square. But the new Northern Light takes Web searching more seriously. This ad-free search tool did an above-average job of finding sites that were relevant to my queries. The unique Custom Folders feature, which tries to organize search results for easy browsing, didn't always work well in my tests, but when it did, it helped. For a fee, the site also offers access to material from over 1800 publications; pricing begins at $1 per article. Northern Light; www.northernlight.com.

—Harry McCracken

Small business networking solutions are just that: small.

First PCI Sound Cards: Music to Your Ears

SOUND CARD

LONG A fixture—and a source of frustration—in multimedia PCs, the ISA sound card is on its way out. The newer cards fit in PCI rather than ISA slots and work better with Windows 95. They offer full 16-bit, 44.1-kHz wavetable audio; special sound effects; customizable MIDI playback; and multichannel playback and recording.

I had no trouble installing and using shipping versions of the **PCI-128 Wave** card by Aztech Labs, and Diamond Multimedia's **Monster Sound** card. The PCI-128 Wave can produce 128 simultaneous MIDI instrument sounds (compared to the 32 or 64 of ISA boards) to yield a more realistic playback of complex MIDI scores. The Aztech uses the fast PCI bus to access MIDI sounds stored in your system memory, so programs can customize sound sets. The wavetable audio playback gets a boost from the PCI-128 Wave's built-in SRS stereo enhancement, which adds depth and position to sounds in recorded digital tracks.

The PCI-128 Wave comes with software for playing, editing, and creating WAV and MIDI files. Street priced at $149, it's a good choice for typical business applications.

Gamers should check out the $150 Monster Sound card. While its MIDI playback is limited to 32 instruments, the Diamond card includes impressive "positional 3D" audio, which allows your desktop speakers to throw sound all around you. The effect can be startling and adds depth to games that have 3D audio support. The card comes bundled with several good Windows 95 games that take advantage of this feature.

—*Michael Desmond* ▶

PCI-128 Wave

PRO: Impressive MIDI sound, lots of bundled multimedia software.

CON: Lacks positional 3D audio for games.

VALUE: An affordable choice for Windows 95 productivity packages.

Aztech Labs
800/886-8859
www.aztechca.com
Street price: $149
READER SERVICE NO. 736

Monster Sound

PRO: Great 3D sound effects, bundled games.

CON: Like the Aztech card, doesn't work with DOS-only software.

VALUE: An excellent choice for Windows 95 gamers.

Diamond Multimedia
800/468-5846
www.diamondmm.com
Street price: $150
READER SERVICE NO. 737

ntroducing Medley97: The high-powered networking olution that fits.

Mango™ Medley97

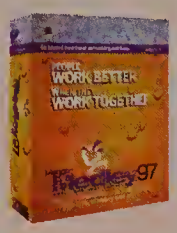
No doubt about it. The networking options available to small businesses have been no more than big business solutions trimmed down for the "little guy." At Mango, we think small business deserves more.

Designed to fit the small business.
Introducing Medley, the incredibly powerful network software for 2 to 25 PCs that even Wally can set up *and* use. (He's the guy in the trunks!) When we say simple installation—we mean it. It installs a complete network brimming with powerful industry standards like TCP/IP, Ethernet, and, of course—support for Microsoft Windows. All with the push of a button and a few minutes' time. *Administration?* Forget about it! Medley is completely adaptive—which means it maintains itself. *Safe?* Of course! Medley provides both powerful security features and fault tolerance—so you can rest easy.

PCWEEK BEST OF COMDEX WINNER!

Don't just network—it's cool to pool.
As if powerfully simple networking weren't enough—Medley introduces a revolutionary new concept called "pooling." With pooling, your people not only share files, they share disk space, memory, printers, and more. Incredibly, the more people in the Medley pool, the more powerful it becomes.

Take the plunge! Try Medley FREE.
The future of networking has arrived. So try it on for size! Dive into our Web site or call us today for a free evaluation copy of Medley97. You'll appreciate how comfortable networking can be.



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Mango's Medley97 was a winner of PC Week's Best of Comdex Award at the1997 Fall Comdex, November 19, 1997. Medley97 is available through an extensive network of Authorized Solution Providers, as well as through retail stores and mail order catalogs.

Circle 132 on reader service card

Affordable Decision-Making Tool for Managers

DECISION MAKING

SPREADSHEET users recognize the value of modeling tools that let you represent a quantity (such as projected sales for a year) with a range of numbers scaled according to probabilities. Palisade's PrecisionTree and Decisioneering's Analytica, both early professional modeling packages, work well but cost a bit much at $795.

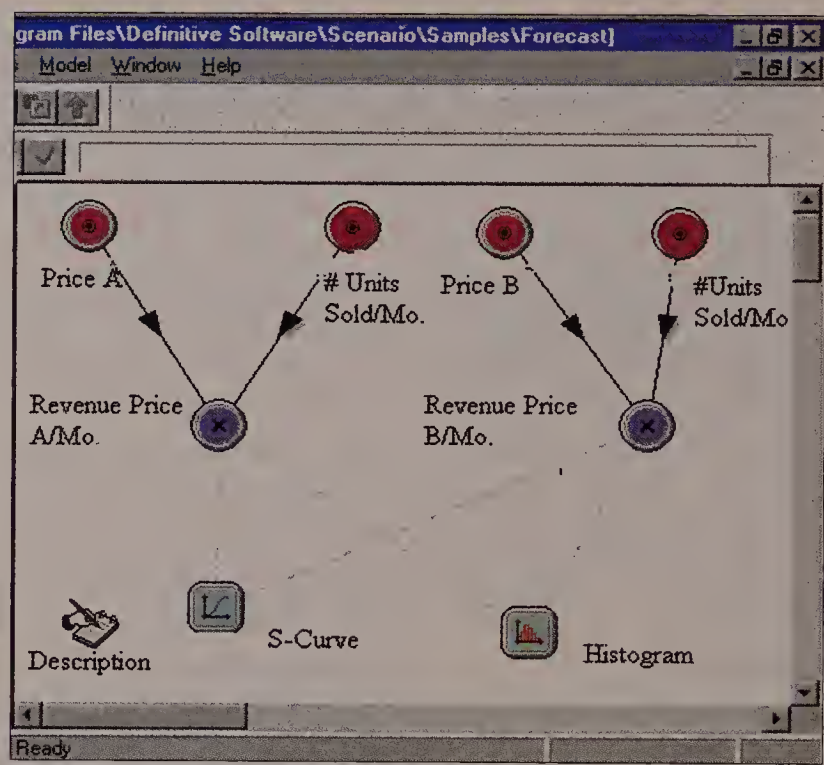
Now, Definitive Software's **Definitive Scenario** offers many of those same features for only $195. It's a good fit for business managers who need to ask what-if questions but don't want to purchase a high-end statistics package. I used a shipping copy of the program.

To build a business model in Definitive Scenario, you drag and drop graphical elements to make a diagram that displays inputs (perhaps taxes, costs, and sales by region) and outputs. You associate each input with a distribution of values, then let the program run a simulation that automatically tries out ranges of different values. You can also link to Microsoft Excel worksheets to model your data. It would be easy, for example, to figure out a range of probable sales profits, or costs for labor during a busy season.

Expect to spend a few days getting familiar with Definitive Scenario. The manual is a bit thin, and despite the program's quick built-in tutorial, you'll mostly learn by doing (and checking out the library of what-if questions). The dozens of templates range from break-even and buy-or-lease calculations to fairly complex business simulations. You can plug in your own numbers and use these ready-made models.

The package isn't as sophisticated as a mathematics professor might like. But Definitive Scenario is a useful tool at a modest price.

—*Charles Seiter*



EXPLORE YOUR OPTIONS: Definitive Scenario lets you pose what-if questions about your business, using helpful premade templates.

Definitive Scenario

PRO: Feature-rich, with good template library.

CON: Slender manual, built-in tutorial is too brief.

VALUE: Useful decision-making tool at a great price.

Definitive Software

303/460-0100

www.definitivesoftware.com

List price: $195

READER SERVICE NO. 739

SPSS 8.0: Statistics Get Down to Business

STATISTICS

SPSS INC. continues to help its flagship statistics package get down to business. The newest arrival, **SPSS 8.0,** looks as good as it works. It offers three main enhancements over the previous version: better graphics, a Smart Viewer utility to simplify e-mail distribution of reports, and options for Web publishing. I tested a preproduction copy.

SPSS 8.0 has a hefty $795 list price, but for managers who need statistics for survey analyses, quality control, and forecasting, it's worth the money. If you need only basic statistics, you can probably make do with a less expensive package or even a spreadsheet.

The statistical-test content of SPSS has been tweaked a bit; for example, you'll find improved tests for survey applications. But the main enhancements suit a business audience rather than the mathematics crowd. SPSS now lets you drag and drop variables into tables and then pivot any table, so you can see with a quick bit of mouse work which elements in a business model will have the biggest impact on results.

When you're done analyzing, you can share your report by e-mail: Recipients can study and rearrange report components using the program's Smart Viewer feature. This means that your company doesn't need a separate copy of SPSS for everyone on the distribution list.

The program's fancy new 3D graphics are presentation-worthy (and can be saved in JPEG format for use on Web pages), but you'll have to crawl through many more dialog boxes than you would with Microsoft PowerPoint.

SPSS 8.0 is an excellent next step for managers who have outgrown basic stats.

—*Charles Seiter* ■

SPSS 8.0

PRO: Stats veteran provides enhanced graphics and reporting tools.

CON: Graphics features take some time to learn.

VALUE: Pricey but powerful.

SPSS Inc.

312/329-2400

www.spss.com

List price: $795

READER SERVICE NO. 740

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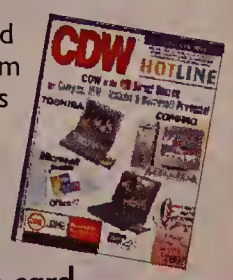

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- Mini-tower models include 56K bps fax modem

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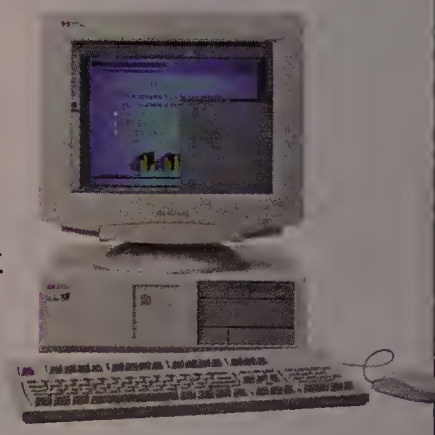
- 10/100 Ethernet

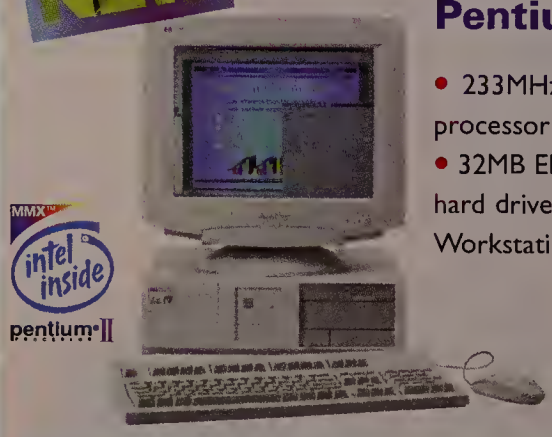
$1129.98 CDW 95737

price drop!



Monitor sold separately

NEW



Monitor sold separately

HP Vectra VL Pentium II Series PC

- 233MHz Intel Pentium® II processor
- 512KB Level 2 cache
- 32MB EDO standard
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- Windows NT® Workstation V4.0

price drop!

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intel inside pentium

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MMX intel inside pentium II

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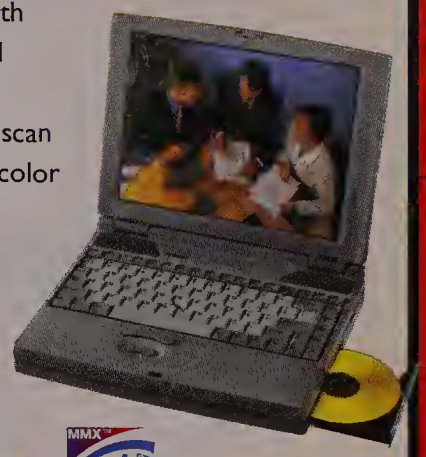

440CDX price drop!
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440CDT
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Satellite Pro 460CDX
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MMX intel inside pentium

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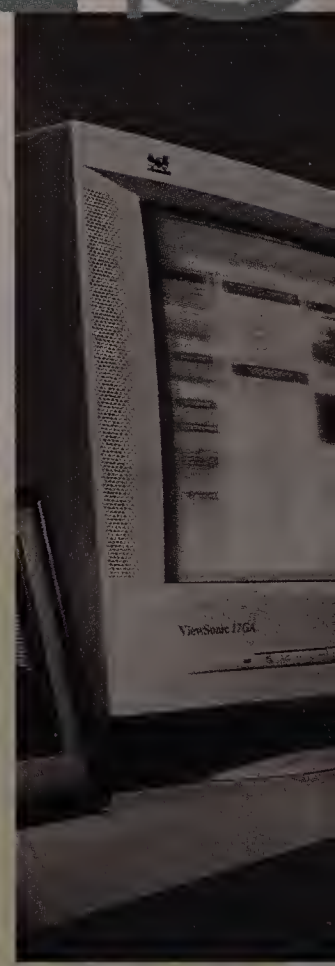
Store Wars

COVER STORY

The Best and Worst Places to Buy a PC



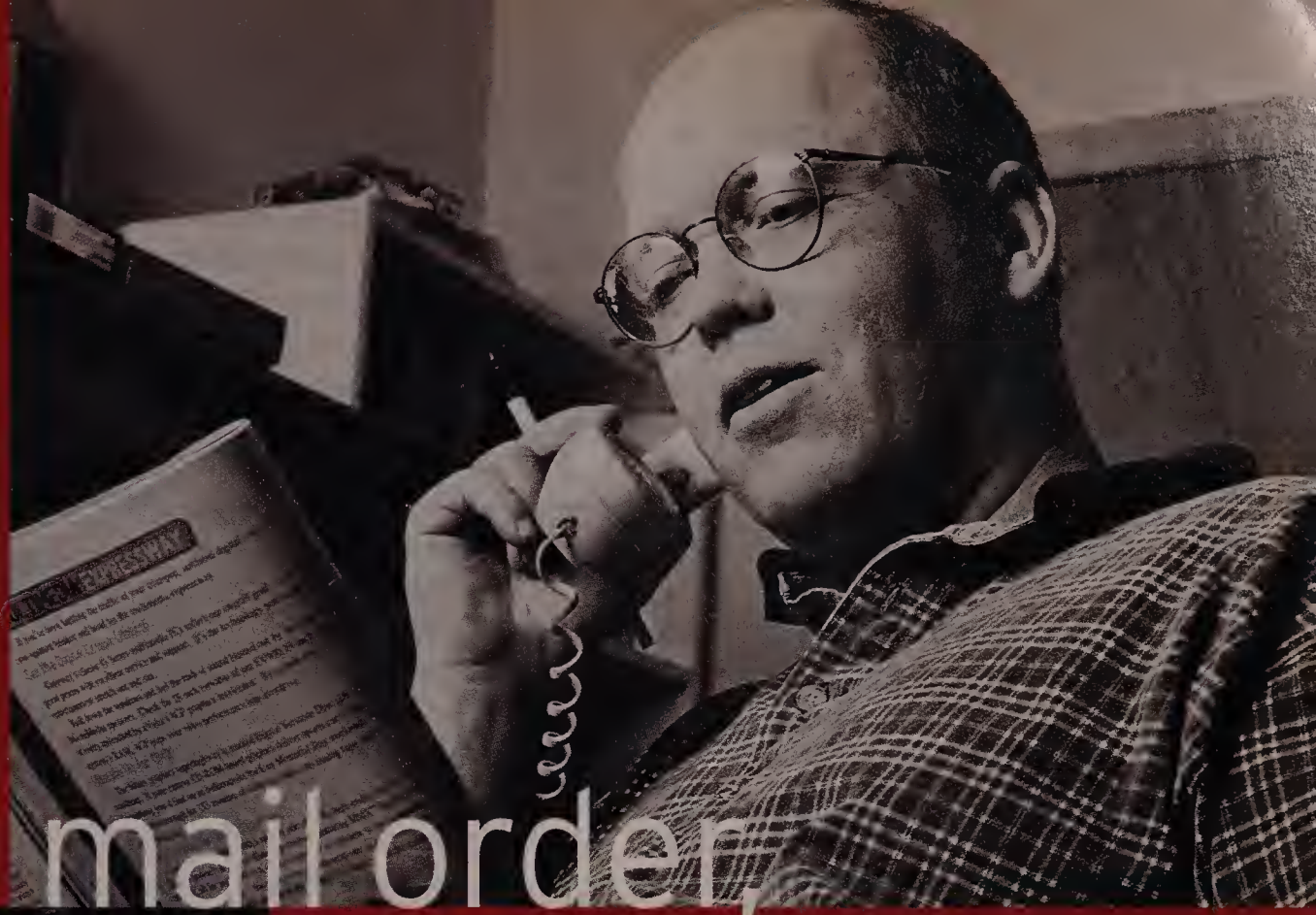
WOULD YOU MAKE vital business decisions on the advice of a computer novice? Purchase an expensive piece of equipment sight unseen? Spend $2500 by clicking a few buttons on a Web site? If you're in the market for a new PC, you may well end up doing any or all of these things. Welcome to the perilous world of PC shopping in the nineties.

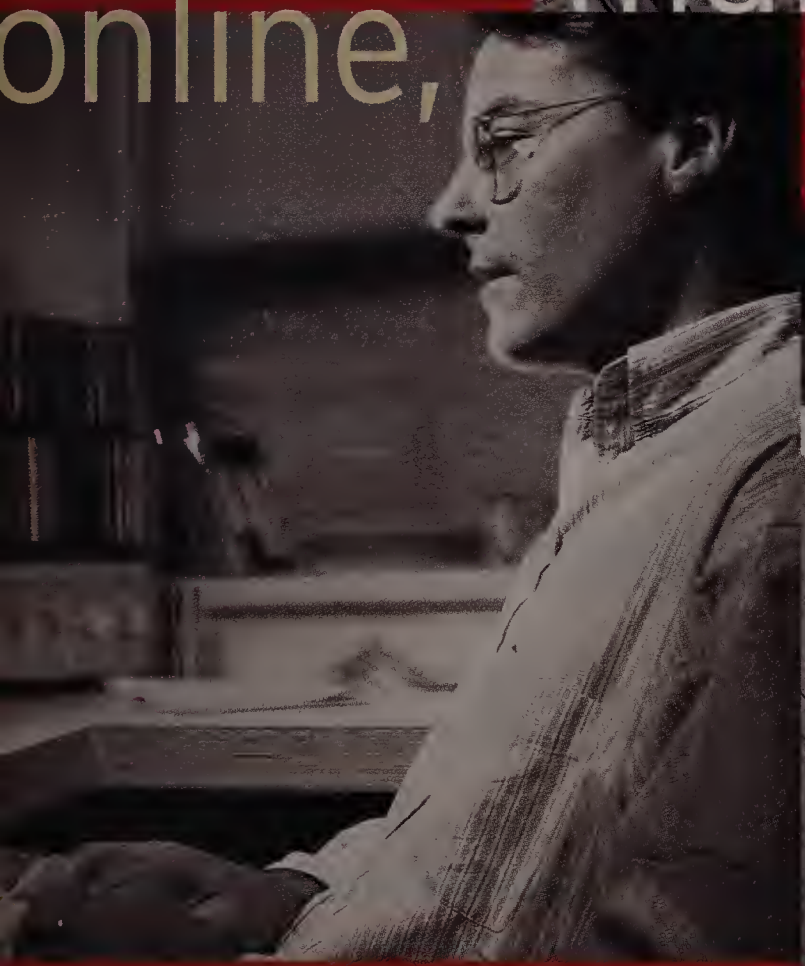
Take our word for it—it's a jungle out there. These days you can walk into almost any major retail computer outlet or electronics store and take home a brand-new PC. And the jungle isn't confined to the mall. The success of mail-order vendors Dell Computer and Gateway 2000 has inspired a swarm of imitators—including Compaq DirectPlus, retail giant CompUSA, IBM Direct, NEC Now, and Sony—to enter the direct-sales market. Finally, both retail and direct outlets are opening Web storefronts that let your fingers do the shopping.

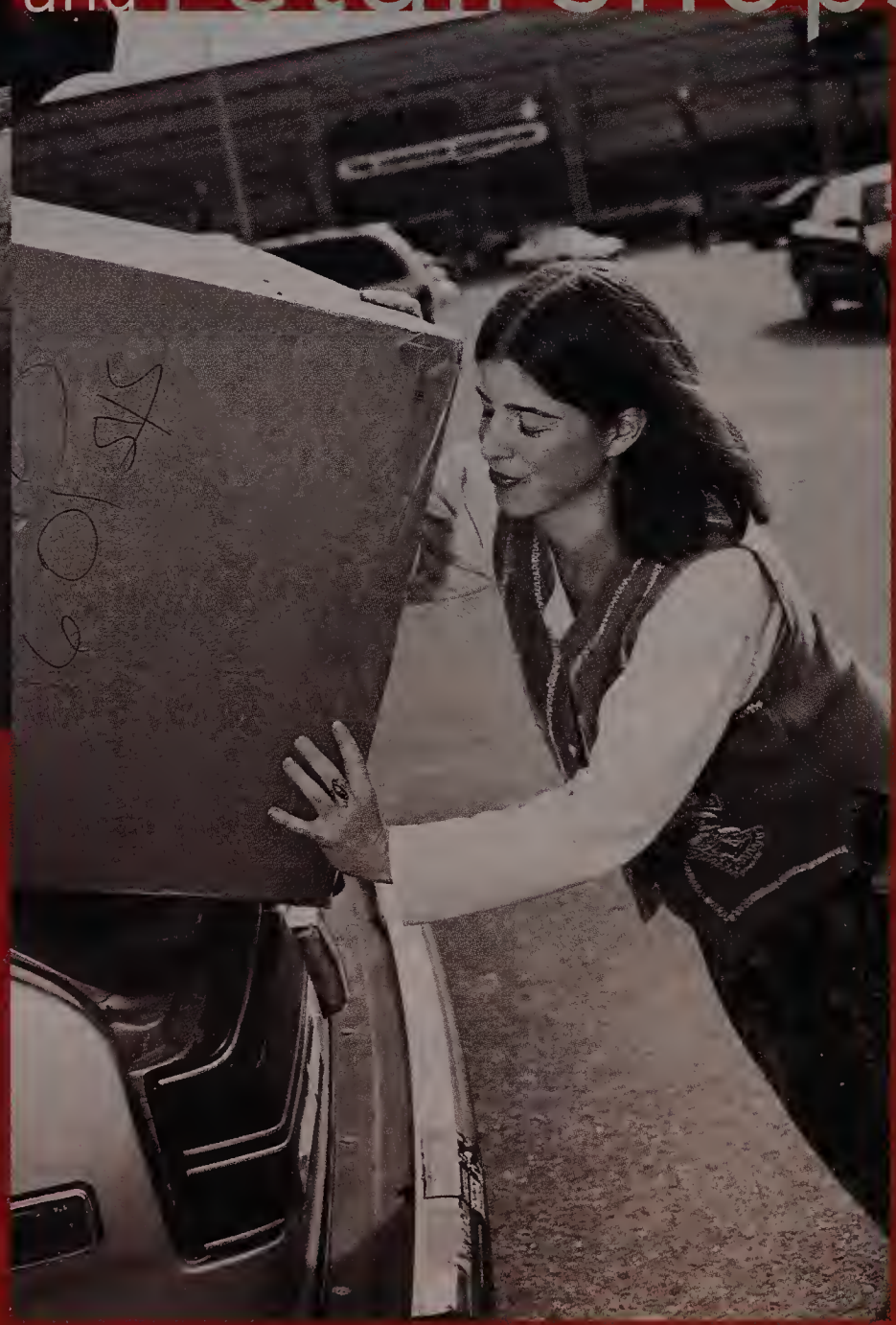
So now you have two big decisions to make: what machine to buy and where to buy it. Each route has its share of pitfalls. Which is best? There was only one way to find out—we went shopping. ►

by Aoife McEvoy with Angela Freeman, Harry McCracken, Peter Scisco, and Scott Spanbauer

Our undercover shoppers bought PCs via mail order, online, and retail shops across the country. Some found great deals... some got screwed.







One fine day last fall the five of us went on an undercover mission: to find out what it's really like to buy a new PC online, retail, and by mail order. Where can you find the best deals? Get the best service? Encounter the most experienced sales folks? And what unpleasant surprises are you likely to encounter along the way?

We visited 25 retail outlets in five major metropolitan areas: Boston; Denver; Greensboro, North Carolina; San Francisco; and San Jose, California. We hit computer superstores (CompUSA, Computer City), consumer electronics boutiques (Circuit City, Best Buy), and office supply warehouses (Staples, OfficeMax). We also stopped by a Sears department store and dropped in on smaller, local retailers in all five locations.

But we didn't stop there. We also called the sales lines of five major mail-order companies: Dell, Gateway 2000, IBM Direct, Micron, and NEC Now. (Had Compaq's and Sony's direct-sales lines been active at the time, we'd have tested them too.) We browsed the virtual aisles at five Web sites: CompUSA Direct, Dell Store, Gateway, Internet Shopping Network, and Quantex. Then we ordered computers from each of the mail-order and online stores and from five of the retailers—15 new PCs in all (actually, two of our machines never arrived; more on that later).

To minimize fluctuations in price and inventory, we attempted to do all our shopping on the same day—and we almost succeeded (see "Diary of an Undercover Shopper"). And to disguise our real motive, we lied through our collective teeth. Our ruse: We were looking for a PC to do work with at home, browse the Web, and play some games. We wanted a Pentium MMX-200 machine with 32MB of RAM, a 4GB hard drive, a 56-kilobits-per-second modem, a 12X–24X CD-ROM drive, a Matrox Millennium video card with 4MB of RAM, a 17-inch monitor, an internal Zip drive, and standard speakers. Our budget: $2500.

To see if the salespeople out there knew their stuff, we asked them questions an authentic PC buyer might ask. Who made the components inside each system? Could we request the exact parts we wanted? What about custom configurations—could we get 48MB of RAM? The answers were far from consistent and sometimes completely off-the-wall (see "Did They Really Say That?").

Talking Shop

MAIL ORDER offers the best deals and service, with online a close second. If you must buy retail, go with a reputable local dealer.

	COMPANIES	Time from purchase to delivery (days)	Warranty: on-site/parts/labor (years)	Extended warranty cost	Extended warranty terms	Money-back guarantee (days from delivery)	Return shipping cost	Restocking fee
MAIL ORDER	Dell Computer	9	1/3/1	$99	3 years on-site	30 [3]	$100 (one way)	none
	Gateway 2000	9	1/3/3	$99	3 years on-site	30	$95 (one way)	none
	IBM Direct	27	0/1/1	n/a	n/a	30 [3]	$137 (two ways)	none
	Micron	7	1/3/3 [4]	$99	3 years on-site	30 [3]	$198 (two ways)	none
	NEC Now	11	1/3/3	$99	3 years on-site	30 [3]	$110 (one way)	none
ONLINE	CompUSA Direct	6	90 days/1/1	$270	3 years on-site, parts and labor	10	$167 (two ways)	none [5]
	Dell Store	7	1/3/3	$99	3 years on-site	30 [3]	$110 (one way) [6]	none
	Gateway 2000	9	1/3/3	$99	3 years on-site	30	$95 (one way)	none
	Internet Shopping Network	7	0/1/1	n/a	n/a	30	$188 (two ways)	none
	Quantex	n/a [7]	1/3/1	$200	4 years on-site, parts and labor	30	n/a	none
RETAIL	Circuit City San Francisco	immediate	90 days/1/1	$269	4 years on-site, parts and labor	14	n/a	none
	CompuMax Winston-Salem, North Carolina	immediate	0/1/1	n/a	n/a	30	n/a	25% [8]
	CompUSA Natick, Massachusetts	n/a [7]	1/3/1	$100	3 years on-site, hardware	10 [9]	n/a	none
	Computer City Westminster, Colorado	immediate	1/1/1	$200	4 years carry-in, parts and labor	14	n/a	none [10]
	OfficeMax San Francisco	immediate	90 days/1/1	$199–$249	3 years on-site, 90 days software	14	n/a	none

n/a = not applicable

[1] Days from return of PC.

[2] Scored on a scale of 1 to 5; 5 is best. Based on criteria including efficiency, convenience, and salesperson's knowledge and customer service skills.

[3] Days from when PC is shipped.

[4] Five years on CPU and memory.

[5] 15 percent restocking fee if returned after 10 days.

[6] Higher shipping fee than mail-ordered Dell PCs due to larger monitor.

[7] A canceled order.

Once we got the machines home, we set them up, evaluated the documentation, called tech support, checked out online help, and packed the systems back up in their boxes and returned them.

Our findings? Every buying route has its perils, but buying direct seems to have the fewest—it's efficient, easy, and, with the notable exception of IBM Direct, reliable. The technology is state-of-the-art, the prices are reasonable, the systems are usually easy to customize, and the salespeople are first-rate. The downside: It takes days (sometimes weeks) to get your computer, and shipping can be a hassle.

Buying PCs online offers most of the advantages of mail order and adds some of its own. The prices are comparable, and in most cases it's easier to research your purchase and custom-configure your system. But Web stores have a fatal flaw: There may not be anyone to answer questions or tell you when your PC will arrive. And as we discovered, e-mail is no substitute for a phone call—we're still waiting for replies from Gateway and Quantex. Our advice: Do your research online, but when it's time to order, pick up the phone.

And retail? Well, let's just say you're on your own. The systems for sale in the bigger stores are often older, more expensive, and usually sold as is. Aside from adding RAM or selecting a monitor that's already on the shelf, you can't customize them to your liking. And you can't always trust the information thrown at you in the larger chains. In most cases, we knew far more than the staff did about the computers they were selling. If you absolutely must kick the tires before you buy, a local independent retailer is probably your best bet. But local shops are a riskier venture; they're more likely to go belly-up than a national chain, and will usually hit you with hefty restocking fees if you change your mind after you buy.

Of course, in each area some vendors soared, while others fell flat on their faces. On the following pages we'll tell you what we found when buying PCs through each route, then we'll discuss our experiences setting up the systems, getting tech support, and sending them back for a refund.

Wait for refund [1]	Overall shopping experience [2]	Comments
13 days	4	Ordering was quick and easy, though we had to prod the sales rep to fax back the system specs. The only place that gave us exactly what we wanted.
14 days	4.8	Score says it all. Gateway's efficiency, knowledge, and selection were impressive. We ordered a PC different from our target, based on the rep's recommendation.
28 days	2.7	Thumbs-down—we couldn't get system specs faxed to us, the order-status phone line didn't work, and customer service was poor.
18 days	4.3	Sales rep knew her stuff when it came to answering our questions. Our system arrived early, and the company even called to let us know it was coming.
7 days	4.4	Sales rep was friendly, helpful, and prompt in faxing specs and responding to questions. The computer even arrived a week early.
23 days	3.3	Huge selection, but navigating through the site was difficult, and customization tools kept crashing. Stricter return policies than CompUSA retail stores.
14 days	3.7	Good configuration tools. Site gave the option to order online or phone in our order once we'd configured our system online.
14 days	4.5	E-mail response lacking, but configuring and buying our computer online was easy, and it arrived ahead of schedule.
46 days	2.5	Big selection but no customization features. Site doesn't offer a phone number for questions—you're on your own.
n/a	3	PCs not very easy to configure, and our order was canceled. Quantex said it had only been beta testing the site and that it'll be improved by the time you read this.
immediate	2.8	Lots of sales reps to choose from, decent selection of computers. But when it came to the reps' technical knowledge, it was hit-or-miss.
immediate	4.1	No-frills local shop, not for novices. This store built us a great system for a good price, but we had to know what we wanted beforehand. Solid tech support.
n/a	2.1	Large selection, but buying the house brand was a disaster. Configuration tools were unstable and sales reps unhelpful, and our order was mysteriously canceled.
14 days by check	2.8	Poor selection, and sales staff wasn't very knowledgeable. Some computers on display were out of stock or discontinued.
14 days by check	2	Decent selection, but computers were poorly labeled and mostly middle-of-the-road in terms of speed. Salesperson was knowledgeable but not terribly helpful.

[8] If returned within 30 days from purchase; no refunds after that.
[9] 30 days for CompUSA PC American systems.
[10] Store manager imposed a 10 percent restocking fee, contrary to Computer City's policy.

Mail-Order Shopping

HAVE IT YOUR WAY

SAVVY PC SHOPPERS know that buying directly from the manufacturer is a great way to go. The prices are competitive, the technology is cutting-edge, and you can almost always get the exact PC you want. Four of the five direct vendors we shopped with gave us almost hassle-free service; IBM Direct was the exception.

The first thing that distinguishes mail order from the rest is the (mostly) excellent sales help. Most mail-order sales reps knew the systems they were selling from top to bottom and made intelligent recommendations—without high-pressure sales pitches. For example, when Aoife McEvoy asked about getting 48MB of RAM, Gateway rep Milo said, "You'd only need this amount of memory if you were gonna run AutoCAD or something. I don't want to be selling you something you don't need." He also talked her into buying a less expensive video card.

Perhaps mail order's biggest appeal is the ability it gives you to customize the system to your needs. Want a bigger hard drive? Better speakers? No problem. Most online vendors also provide this feature, but few big retailers do. For example, we got Zip drives on almost all our direct-mail systems but were mostly out of luck when it came to the major retail stores.

However, our choice of brand-name components varied. Dell had the widest range of brands to choose from—Angela Freeman had her pick of Matrox or STB graphics cards and Philips or Sony ▶

monitors. But Micron offered only Diamond graphics cards and generic Micron or Hitachi monitors. Likewise, NEC Now offered only its monitors and Number Nine graphics cards.

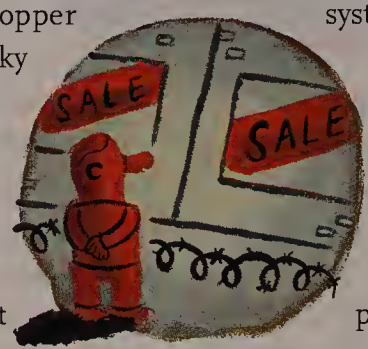
Naturally, that flexibility has a price—no instant gratification. The company has to build the PC and ship it to you, a process that with our PCs took anywhere from seven days to nearly four weeks.

Most companies offer an automated toll-free number for checking on your order. Our advice: Use it. Four of the five mail-order systems didn't arrive when the salespeople said they would. Dell and Gateway sent machines to Angela and Aoife a day *ahead* of schedule—when no one was there to receive them. NEC sent its system to Scott Spanbauer's Boulder, Colorado, office 7 days early, while IBM took a whopping 27 days to deliver its Aptiva L131. Only Micron gave us any warning the machine was coming early.

Need another reason to buy mail order? In some cases, you may not have to pay sales tax. Gateway, IBM Direct, Micron, and NEC Now collected the tax for the states they were shipping to. But Dell collected only a $2.98 "service tax."

IBM NOT SO DIRECT

ORDERING A PC over the phone is convenient, efficient, and quick, right? Not always. While four of our five shoppers had a positive experience with direct vendors, North Carolina shopper Peter Scisco wasn't so lucky with IBM Direct.



It took Pete four days and four phone calls before he was finally able to *order* his Aptiva. Pete wasn't so sure that Chris, his sales rep, was familiar with the technology he was selling. When asked about the modem, Chris said it was made by "Flex Modem" (Flex is a technology standard, not a manufacturer). Then, after recommending the Aptiva L131 system, Chris announced he could sweeten the pot by throwing in a color ink jet printer from Lexmark. Cool. "But when I finally agreed to buy the system," recalls Pete, "he tried to sell me the printer, and I had to remind him that he told me I could have a free one."

Chris then informed Pete that it would take three weeks before he could get the PC, even though the IBM factory is only 85 miles from Pete's home. The final straw? When Pete called to check on the status of his order, the automated phone system failed to work—on three separate occasions. Pete's verdict? "You couldn't pay me enough money to ever shop with IBM Direct again."

So what was the problem? According to Jim Bartlett, vice president of marketing in IBM's consumer division, the Aptiva L131 had launched just a few days before Pete picked up the phone to order it. "There was a tremendous demand for the L131—a lot more than we ever anticipated," Bartlett explains. "The resources may not have been in place to deliver specific customer requests."

Smart Shopping Tips

Do Your Homework Don't rely on a sales rep for accurate advice, particularly in the big retail stores. Read magazines and check out Usenet newsgroups like alt.computer and alt.comp.hardware. Talk to friends and colleagues about their experiences.

Get It in Writing, Part I If you're buying over the phone, have the sales rep fax or e-mail you the system configuration before you buy. If you're online, print out your order form. In stores, ask for spec sheets.

Get It in Writing, Part II Is that money-back guarantee good for 30 days from when you receive the computer, or from when you order it? Are there restocking fees? Your friendly salesperson may not know. Ask to see the policies in writing before you buy.

Shop Around The best price is not always the best deal, so research each company's reputation for reliability and customer support, and check out the warranty. Pick a target dream machine so that you'll be able to compare apples to apples.

Know Thy Salesperson Get the name and extension number of your mail-order salesperson. If you have a question, you can get through directly without wading through voice menus.

Find the Right Rep If you're in a store, quiz your sales representative on technical details. If you get that glassy-eyed stare or a bunch of techno-gibberish, move on to another rep.

Check Out the Locals If you really want to buy from a local retailer, do your homework on the company's reputation. See how long it's been in business (at least five years is a safe bet), and ask for references from existing customers. Local retailers have stickier return policies (if they accept returns at all).

Pounce on Price Drops Some mail-order companies (like Dell) will give you a rebate if the price of your system drops, usually within 30 days of your invoice date. Most retail stores will offer to match competitors' prices on the same PC, or give you a rebate if you find a better price elsewhere.

Check Your Order Status Did the order that you placed go through? Was your credit card declined? Will your new computer arrive on time? Many companies won't tell you these details—unless you ask. Call the customer service line to find out what's up with your order.

Know Your Shipper If your PC is going to arrive ahead of schedule or late, you need to know so that you can arrange to be home to receive it. Most shipping companies will attempt to deliver only three times. So pin down delivery time as accurately as you can.

Ask Who Pays Shipping If you return a system sent through the mail, you may be stuck with shipping charges for both directions.

Get Refunds Faster Be absolutely sure that you repack everything carefully in the original boxes. Follow the return instructions to the letter when it comes to placing shipping labels, writing return merchandise authorization numbers on the boxes, and so forth.

Find Out About Support If you want your retail store to provide tech support and service, get its extended warranty in writing. Will it support software? Does the store make on-site repairs? When does the warranty take effect?

Use a Credit Card If your PC never arrives or you get in a tussle with the vendor, most banks will erase the disputed charges from your account.

—A. F. and A. M.

Mail-Order PCs

Even when you factor in shipping costs, mail order offers the best prices.

OUR DREAM MACHINE: Pentium MMX-200 with 32MB of RAM, 4GB hard disk, 12X-24X CD-ROM drive, Matrox Millennium video card with 4MB of RAM, 56-kbps modem, 17-inch monitor, internal Zip drive, standard speakers.

COMPANIES	System	Price (including shipping)	How close we came to our target
Dell Computer 800/388-8542 www.dell.com	Dimension XPS M200s	$2296.98	exact match—the one and only
Gateway 2000 800/846-2000 www.gateway.com	G5-200	$2292.62	STB video card with 2MB of RAM
IBM Direct 800/426-2255 www.direct.ibm.com	Aptiva L131	$2792	PMMX-233, Trident video card with 2MB of RAM, no Zip drive, more expensive Bose speaker system
Micron 800/634-8799 www.micron.com	Millennia MME 200	$2197.95	15-inch monitor (17-inch would increase price by $170), Diamond video card
NEC Now 888/863-2669 www.nec.com	Direction SPT 200	$2096	15-inch monitor (17-inch would increase price by $219), Number Nine Reality video card

Online Shopping

GREAT DEALS, BUT IS ANYBODY HOME?

INFORMATION WANTS to be free, goes the Netizen mantra. Still, it's amazing how quickly you can spend $2500 just by clicking a few buttons on a Web site.

Buying a PC online is a lot like purchasing one by mail order. You're likely to have the same choice of computers, range of configuration options, and lower-than-retail prices. If you're ordering from a direct vendor's site, like Dell's or Gateway's, you're buying the same systems you would get if you ordered over the phone.

Shopping online can be more convenient than mail order or retail. You don't have to deal with voice menus, throngs of Saturday shoppers, or salespeople waiting to ply their trade. You can play with configurations and in some cases do side-by-side system comparisons before you order. And you can do it at any time, day or night. Still, dealing with some online vendors, namely CompUSA Direct, Internet Shopping Network, and Quantex, proved to be more hassle than it was worth.

SITES UNSEEN

THE KEY TO successful online shopping is finding the information you need. At most sites, we found navigating a snap. But CompUSA Direct's site was far from intuitive—it wasn't clear what icon we had to click to get to an ordering screen.

"It was actually quite confusing," reports intrepid shopper Scott. "To get to the home section, you clicked on Multimedia Systems. The other choice was Pentium, which was for corporate PCs. You could easily go to the wrong section, not find what you were looking for, and give up."

With the exception of Quantex's site, getting the full lowdown on warranties or return policies was not all that easy either. On the Dell Store site, we had to use the Site Search option to find the information.

Because Dell, Gateway, and Quantex sell just their own brands, they all let you custom-configure a PC using drop-down menus. This feature made it easy for us to see how much money we could save by, say, getting a cheaper sound system.

In contrast, CompUSA and ISN sell a range of systems—you can choose from 10 companies with CompUSA, and 11 with ISN. This selection made it easier to compare competing brands of PCs (something you can't do on a direct vendor's site), but we couldn't create our own configurations or specify brands of components for most systems. For example, when Pete tried to order a bigger hard drive for his Toshiba Infinia 7202, he received a terse e-mail message from ISN: 'Sorry, you cannot alter or substitute this product and we do not do installation'.

CompUSA's PC American brand let us opt for a Maxtor, Seagate, or Western Digital hard drive, among other components. But with other brands we had no idea who made the guts of the machines.

The CompUSA Direct site also features a Compare button designed to let you sort different systems by manufacturer, CPU, and more. But when Scott used it to compare more than a handful of systems, it crashed his browser, taking his order information with it. He had to load up his shopping cart again from scratch.

CONTACT, PLEASE?

IF YOU'RE LUCKY, you can find exactly the system you want online, and you're ready to rock 'n' roll. But what if you have some questions the Web site can't answer, like "Can I get a Zip drive?"? This is where online shopping starts to break down.

> Pete received a terse e-mail from ISN saying, 'Sorry, you cannot alter or substitute this product and we do not do installation'.

You'd think that since you're ordering online, you could send questions by e-mail, right? Wrong. Responses to most of our questions were slow or nonexistent. Dell Store answered us within 24 hours, but CompUSA Direct and ISN both sent e-mail five days later, and neither Gateway nor Quantex responded at all.

All the sites save CompUSA sent a confirmation once our order had been placed, but only Dell let us check the order status online. Otherwise, as with mail order, we were on our own. No one told us ▶

when systems shipped early, so we encountered the same hassles trying to coordinate our schedules with the shippers'. On the upside, most of the PCs we ordered online came faster than those we got through mail order—from six days for CompUSA to nine days for Gateway.

The glaring exception to prompt delivery was Quantex. Harry McCracken was told it would take at least three weeks, but he was still waiting for his Quantex QP5/200 M1 MMX six weeks later. When he phoned for status, the reply was that his system was "in production." Actually, Quantex had canceled Harry's order without telling him. The reason? The billing address on his credit card was not the same as the shipping address, although the Web site had requested both. A staff operator had entered Harry's phone number incorrectly, so the company couldn't contact him.

Phil Koserowski, Quantex's Internet marketing group manager, admits that the online-purchasing operation wasn't quite ready for prime time. "We kept the buying part of the site up for two days only, as part of beta testing, and we took it down after that to continue working on it." However, there was no notice of beta testing on the site the day Harry visited it, and none on subsequent visits either. By the time you read this article, Koserowski says, the online-buying option should be fully operational.

Retail Shopping

BIG STORES, BIG PROBLEMS

DOES IT MAKE you nervous to spend thousands of dollars on a computer you've never actually seen? Then retail may be your only alternative. Most stores do offer advantages. You can choose from a range of brands—the CompUSA in Natick, Massachusetts, for example, carried eight brands, including Compaq, Hewlett-Packard, IBM, NEC, and Sony. You can easily compare one PC against another, and if you're in a hurry, you can take your dream machine home that day.

But retail salespeople don't always give you accurate information or understand your needs. And if you're looking for the hottest new technology or want to create your own custom system, you're probably out of luck. The exceptions to this rule are local independent retailers, though they too have their drawbacks.

ARE YOU BEING SERVED?

WHEN YOU VISIT your local computer superstore, don't expect expert advice. We found that the sales staffs' technical knowledge varied widely from store to store and even within stores in the same chain. Scott was blown away by Beth, a manager in the Westminster, Colorado, Circuit City, when she popped the hood of a Sony VAIO PCV 130 to talk about the system's internal features. Hundreds of miles away in the San Francisco Circuit City, Beth's colleague Garen opened the case of the same machine and confidently showed Angela where to add more memory—mistakenly pointing to an ISA expansion slot.

CompUSA had the best selection of machines and fairly knowledgeable sales reps, but staff fell short when it came to helping us make a decision. The sales folk we encountered in Computer City, OfficeMax, and Staples knew little about technology and relied heavily on printed materials and fliers.

Even worse, several of our shoppers felt that the sales reps didn't give a hoot about their needs—a huge contrast to the ▶

Harry was told his system was 'in production'. Actually, **Quantex** had **canceled** his order without telling him.

Online PCs

Online prices are comparable to those for mail order, but don't expect personalized service.

OUR DREAM MACHINE: Pentium MMX-200 with 32MB of RAM, 4GB hard disk, 12X-24X CD-ROM drive, Matrox Millennium video card with 4MB of RAM, 56-kbps modem, 17-inch monitor, internal Zip drive, standard speakers.

COMPANIES	System	Price (including shipping)	How close we came to our target
CompUSA Direct 800/266-7872 www.compusa.com	Compaq Presario 4808	$2649.41	proprietary video card with 2MB of RAM, no Zip drive
Dell Store 800/474-3355 www.dell.com	Dell Dimension XPS200	$2575.98	19-inch monitor (17-inch would decrease price by $199)
Gateway 2000 800/846-2000 www.gateway.com	Gateway 2000 G5-200	$2254.64	STB video card with 2MB of RAM
Internet Shopping Network www.isn.com	Toshiba Infinia 7202	$2162.63	15-inch monitor, 16X CD-ROM drive, ATI Rage II video card with 2MB of RAM, no Zip drive
Quantex 800/760-9001 www.quantex.com	Quantex QP5/200 M1 MMX[1]	$1688	15-inch monitor (17-inch would increase price by $95), STB video card, no Zip drive

[1]Computer was never actually purchased due to canceled order.

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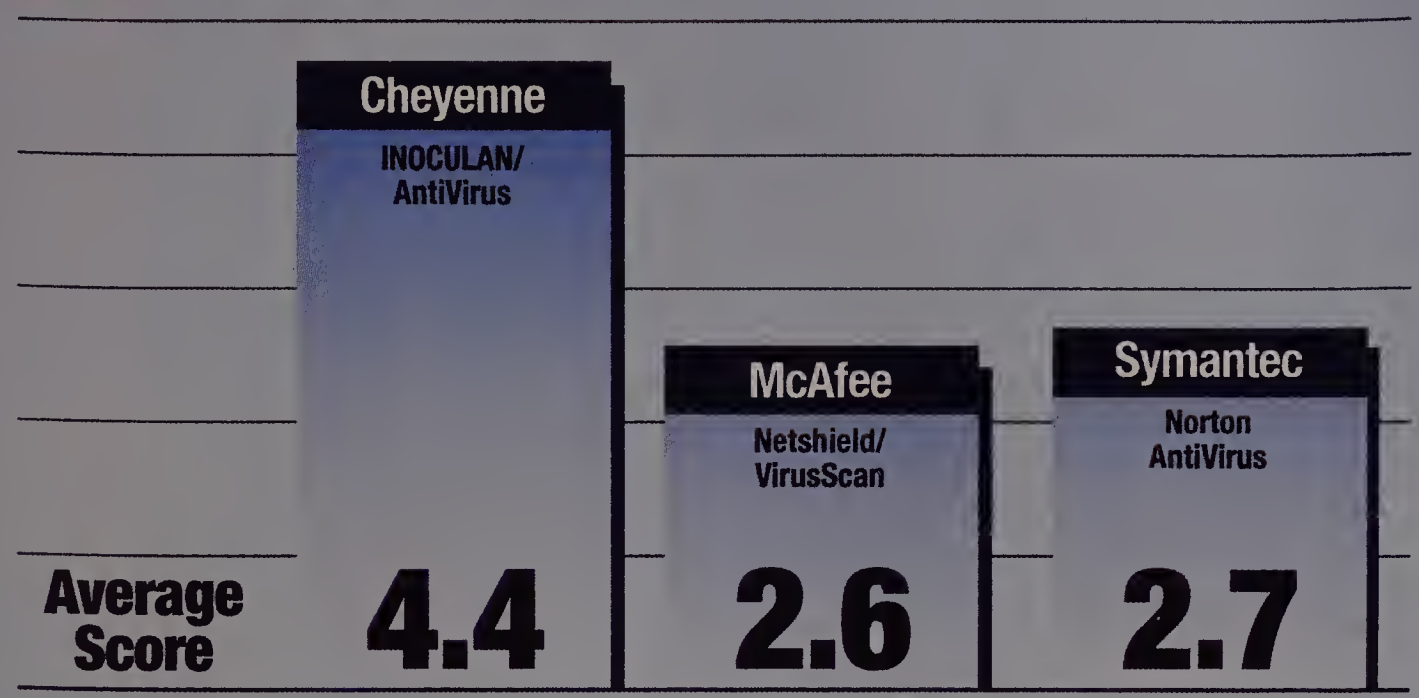

Source: LAN Times July 21, 1997.
Score based on a 1-5 scale.

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Because Inoculan detects and cures more viruses offering an unmatched 100% detection and cure rate of macro "viruses in the wild."*

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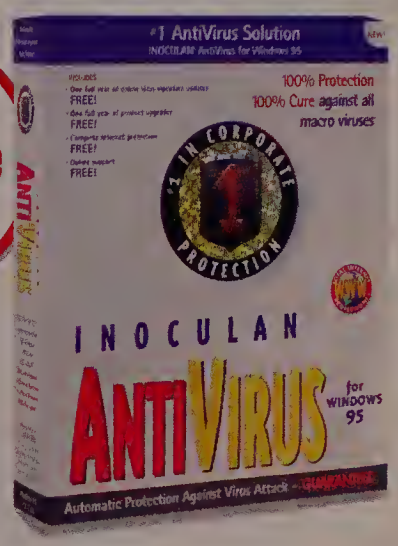
$30 Competitive Rebate†

Do it today, because when it comes to something as dangerous as viruses, you simply can't afford a solution that's second rate.



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* Based on tests conducted by the Computer Associates Virus Research Center. ** Prices shown are estimated U.S. street prices and may vary at your local retailers.
† $30 Main-in competitive rebate for users of any other anti-virus product or $10 rebate for first-time buyers.

helpful mail-order sales reps. While Harry was browsing in Circuit City in Burlington, Massachusetts, salesperson Bob went to great lengths to sell him a customer-returned IBM Aptiva. When Angela visited the San Jose CompUSA, she felt that sales rep Michael would tell her whatever she wanted to hear to make the sale.

Many salespeople were also unfamiliar with their own stores' return policies or restocking charges. At the Staples store in Brighton, Massachusetts, Harry was told that a 10 percent restocking fee was charged for returns; the company policy, however, is that there is no fee. And some salespeople simply gave us inaccurate information. So here's another rule of retail: Ask to see the store policies in writing.

Even if the store has a selection of brands, chances are the PCs won't be the newest on the market. While most online and mail-order vendors had several 300-MHz machines, the most advanced system we found at the big stores was a Pentium II-266 at CompUSA and Computer City. The best the other chains could offer were 200-MHz and 233-MHz Pentiums with MMX. At San Francisco's OfficeMax, Aoife discovered that most of the Pentium MMX-200s on display were out of stock. Sales rep Gary even tried to sell her a demo model 17-inch Compaq monitor that the manufacturer had discontinued.

And don't even think about swapping components. If you want a Zip drive or an extra 16MB of RAM, you'll probably have to buy it separately and install it yourself. Some stores will do it for you, but you'll need to make an appointment and bring your computer back for installation.

NO FREE LAUNCH

TIMING IS EVERYTHING. Our shopping extravaganza happened to coincide with the official launch day of CompUSA's build-to-order PC line, the CompUSA PC American. Customers who wandered into any CompUSA would be able to use a kiosk similar to the online configurator to order exactly the system they wanted. This scheme was designed to combine the best of retail, mail-order, and online shopping, but as our man in Boston discovered, it offered the worst.

Harry's buying experience was buggy from the start. The kiosk didn't work properly and was difficult to use, the printer wasn't turned on, and the configuration form kept crashing. The reps knew little about this huge product launch, and most of them recommended other brands.

Nevertheless, Harry found good configuration options, and he bought a system with a Zip drive and 4MB of video RAM on an ATI graphics card, per sales rep Chris's suggestion. But when he received neither his computer nor word about when it might arrive, Harry got worried. So he called the store and left a message. A few days later, he left another message. And another. More than one month ▶

Diary of an Undercover Shopper

TO-DO LIST

- ❑ Pay cable bill
- ❑ Take out garbage
- ❑ Buy $7000 worth of PCs
- ❑ Call Mom

SO MY BOSS SAID, go visit five computer stores, call a mail-order company, surf a Web shopping site, and buy three computers. And, by the way, could you do it all in one day? Sure, I said. No problem. Then I thought: Can I handle that? Follow along as we relive my day in shopping hell.

8:37 a.m. Armed with my ruse, ready to hit the stores. Phone rings. Hello, Mom. (Guess I can cross that off the list.) "You're doing what?" No, I don't get to keep the computers. No Mom, you can't have one.

9:02 a.m. Dial up Dell sales line. Get Ronnie on the line, tell him my story, ask questions, settle on a system. He promises to fax specs immediately. We hang up.

9:48 a.m. Finish staring at fax machine. Call to remind Ronnie to fax me the specs of my new computer. He does.

10:08 a.m. Call again and give him my Visa number: $2296.98 gone. Ka-ching!

11:22 a.m. Shopping at Office Depot, San Francisco. Sales jock Ron (yes, another one) assures me, "Four gigs is more than enough memory to run games." Well, I should hope so.

12:18 p.m. Slink into San Francisco's Circuit City. Look for a sales rep who's *not* named Ron.

12:36 p.m. Sneak into bathroom to take notes. Suspect manager's on to me. When I come back, she's taken over the sale. We close the deal. I've now spent more than $4000, and it isn't even lunchtime. Look out, Ivana.

1:15 p.m. Cram enormous boxes into tiny car.

1:17 p.m. Realize I can't drive around with my car full of computer boxes. Must ditch the goods or paint "steal me" on the side of my car.

2:04 p.m. Haul two 40-pound boxes up 50 stairs and into my house. Mail order starts looking better and better.

2:16 p.m. Sidle into AT Computer, my local clone joint. Good price, good info, makes me wish I were buying one there.

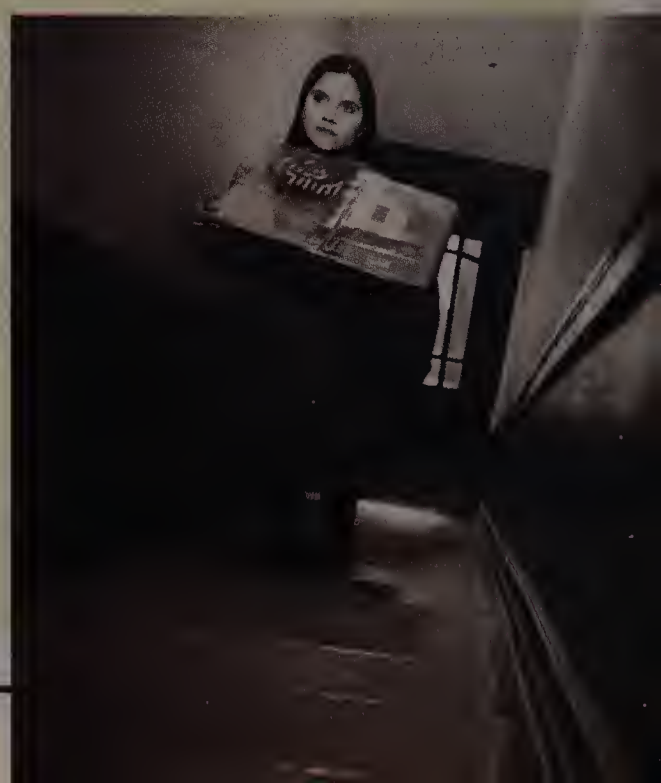
4:24 p.m. Arrive at CompUSA. Stand around for 20 minutes. Finally grab a salesperson named (all together now) Ron and start grilling him. Leave convinced that this store is really a day camp for used-car salesmen.

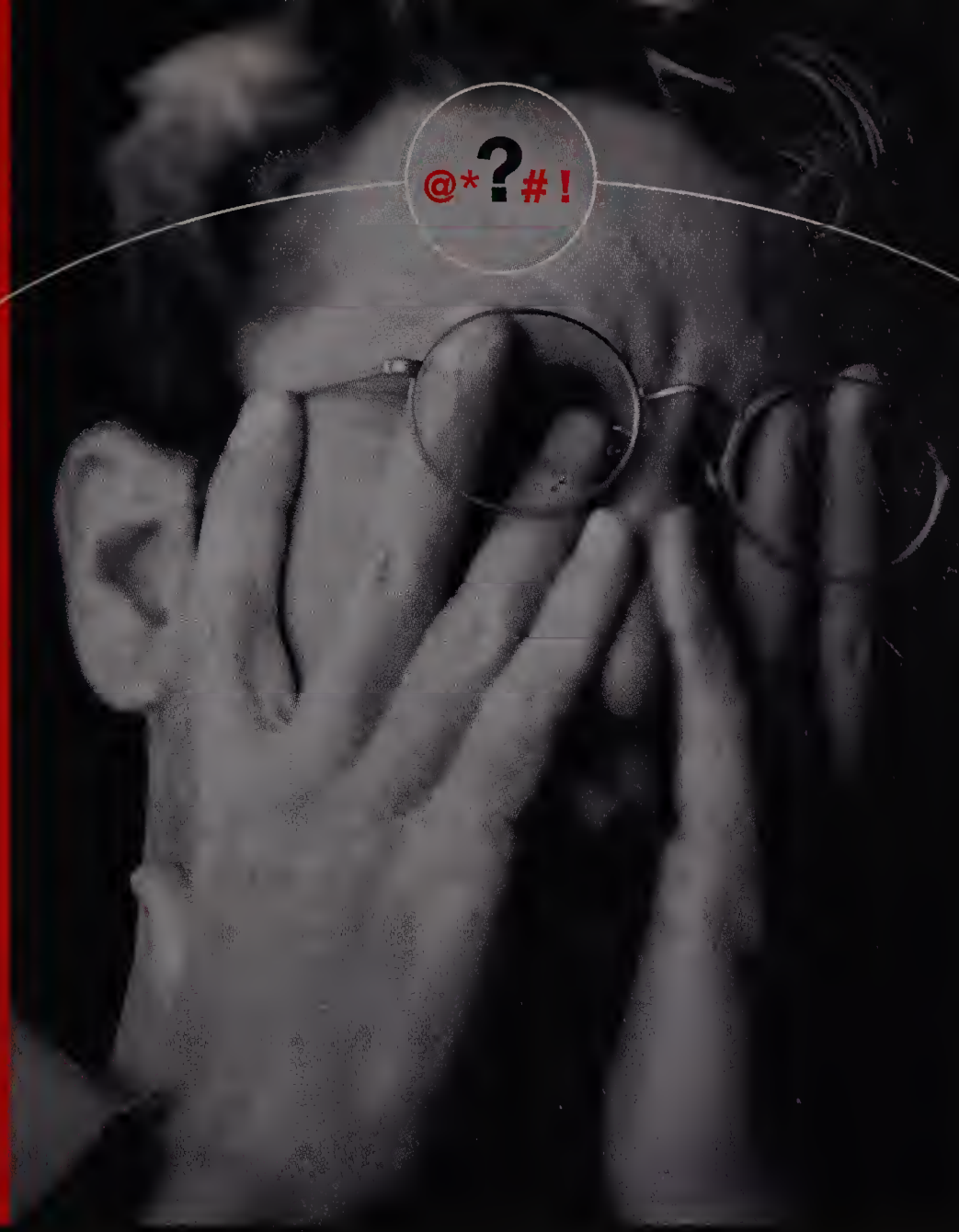
5:42 p.m. Drag myself into Computer City, grab the nearest sales rep, and sob, "Just make it stop!" Well, not really. But I wanted to.

5:44 p.m. Listen to "Well, I could check on that if you want" for the 3947th time that day.

6:45 p.m. Arrive home and fortify myself with a glass of wine.

6:53 p.m. Surf the Web, click on over to Gateway 2000, and lay down more plastic for my third computer of the day. Total charges: $6667.33. Revel in the comforts of home, the absence of sales reps, and the knowledge that I just spent more than my car is worth. And I lived to tell the tale. —A. F.





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- 32X Max^^ Variable CD-ROM Drive
- Sound Blaster AWE64 Performance Sound Card
- Altec Lansing ACS-295 Speakers with Subwoofer

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Business Lease◊: $117/Mo., 36 Mos.
Order Code #590101

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- 64MB SDRAM Memory
- 8.4GB Ultra ATA Hard Drive (9.5ms)
- 1000TX 17" Trinitron® Monitor (15.9" v.i.s., .26dp, 1280 x 1024 max. res.)
- STB nVidia 4MB AGP Video Card
- *NEW* DVD-ROM Drive and Decoder Card
- Sound Blaster AWE64 Performance Sound Card
- Altec Lansing ACS-295 Speakers with Subwoofer
- Iomega Zip 100MB Internal Drive

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- 32X Max^^ Variable CD-ROM Drive
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- 800HS 15" Trinitron Monitor (13.7" v.i.s., .26 dp)
- STB nVidia 4MB AGP Video Card
- 32X Max^^ Variable CD-ROM Drive

★ *Upgrade to 64MB SDRAM, add $99.*
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Common features listed above plus:
- 128MB SDRAM Memory
- *NEW* 9.1GB Ultra ATA Hard Drive (9.5ms)
- 1200HS 19" Monitor (17.9" v.i.s., .26dp)
- STB nVidia 4MB AGP Video Card
- *NEW* DVD-ROM Drive and Decoder Card
- Sound Blaster AWE64 Performance Sound Card
- Altec Lansing ACS-495 Full Dolby Surround Sound Speakers with Subwoofer
- *NEW* Dell Comfort Key Keyboard

$3479

Personal Lease°◊: $158/Mo., 24 Mos.
Order Code #500104

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300MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY

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- 64MB SDRAM Memory
- 8.4GB Ultra ATA Hard Drive (9.5ms)
- 1000TX 17" Trinitron Monitor (15.9" v.i.s., .26dp)
- STB nVidia 4MB AGP Video Card
- *NEW* DVD-ROM Drive and Decoder Card
- Sound Blaster AWE64 Performance Sound Card
- Altec ACS-295 Speakers w/ Subwoofer
- Iomega Zip 100MB Internal Drive
- *NEW* Dell Comfort Key Keyboard

$2999

Personal Lease°: $136/Mo., 24 Mos.
Order Code #500103

DELL DIMENSION XPS D266
266MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY

Common features listed above plus:
- 64MB SDRAM Memory
- 6.4GB Ultra ATA Hard Drive (9.5ms)
- 1000LS 17" Monitor (15.9" v.i.s.)
- STB nVidia 4MB AGP Video Card
- 32X Max^^ Variable CD-ROM Drive
- Sound Blaster AWE64 Performance Sound Card
- Altec Lansing ACS-90 Speakers
- Dell Quiet Key Keyboard

★ *Upgrade to a 1000TX 17" Trinitron Monitor (15.9" v.i.s.), add $75.*
★ *Upgrade to 128MB SDRAM, add $199.*

$2399

Personal Lease°: $110/Mo., 24 Mos.
Order Code #500102

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Common features listed above plus:
- 32MB SDRAM Memory
- 4.3GB Ultra ATA Hard Drive (9.5ms)
- 800HS 15" Trinitron Monitor (13.7" v.i.s., .26 dp)
- STB nVidia 4MB AGP Video Card
- 32X Max^^ Variable CD-ROM Drive
- Integrated Yamaha Wavetable Sound
- Altec Lansing ACS-90 Speakers
- Dell Quiet Key Keyboard

★ *Upgrade to 64MB SDRAM, add $99.*
★ *Upgrade to a 1000LS 17" Monitor (15.9" v.i.s.), add $99.*

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Personal Lease°: $87/Mo., 24 Mos.
Order Code #500101

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and five phone calls later, a CompUSA sales manager told him that his credit card had been declined—despite the fact that Harry's card was several thousand dollars under the credit limit.

As with the Quantex credit card snafu earlier, the CompUSA sales manager blamed the problem on Harry's different billing and shipping addresses—despite the fact that Harry had religiously followed the store's instructions. The manager advised him to either redo his canceled order from scratch or buy a new PC elsewhere.

So what actually happened to CompUSA on that launch day? Larry Mondry, executive vice president for merchandising, says, "We got orders of a magnitude far greater than we expected, and this taxed us significantly." Mondry says the glitch that caused the kiosk crashes has been fixed, but he admits that communication with Harry regarding the billing and shipping discrepancy should have been dealt with appropriately. "Somebody dropped the ball somewhere on our side, no question," he adds.

THE CORNER STORE

SO IS THERE A WAY to get both the face-to-face contact of a retail storefront *and* the flexibility and expertise of a mail-order operation? There is indeed: Buy from one of the smaller, independent PC clone makers. In the five small stores we visited, we didn't see any brand-name systems or glossy brochures, but we found salespeople who knew exactly what they were talking about.

The local stores came closest to delivering the exact configuration we wanted at very competitive prices, along with some room for negotiation. However, some clone builders would not provide us with the specific brands of components we requested. Aside from that, we found a lot of choice for good prices. PCs for Everyone in Cambridge, Massachusetts, would have built our model machine for a mere $1957, including a 17-inch monitor. AT Computer in San Francisco offered to build the same system for $2332, and that price included Microsoft Office 97 Small Business Edition—a $268 software suite. Store salesperson Bart told Angela that if she found an identical clone that was cheaper, he'd be willing to negotiate the price.

The catch? Return policies at local shops are stricter than at chain stores—you face hefty restocking fees if you change your mind, and you don't get a lot of time to consider. Money-back guarantees range from 7 to 30 days, with restocking fees of 15 to 25 percent. In the words of AT Computer's Bart: "If you have us build your PC, you've put some time into thinking about what you want. We build the computer you want, so why would you want to return it?"

But if they've built you a lemon, most of the local shops would rather build you another system than refund your money. Some shops don't even *have* a return policy: Roger of Native Systems in Boulder, Colorado, tells us, "None of our customers have ever returned a computer."

The other risk you run with local shops is buying from a company that's on shaky financial ground or less than reputable; if it disappears, you could be stranded without support—or without your money or machine. (See "Smart Shopping Tips" for suggestions on choosing where to buy.)

> The manager advised Harry to either start his canceled order from scratch or buy a new PC elsewhere.

Refunds and Warranties

RETURN TO SENDER

WHEN THE DUST settled, our undercover shoppers were the proud owners of 13 new PCs. Once we got our systems home, the differences between mail order, online, and retail tended to evaporate.

We were all lucky—setup was smooth, and none of the machines had any defective parts. There was also little difference in technical support between vendors. We received the most thorough answers from CompuMax, Pete's local retailer in Winston-Salem, North Carolina.

Getting our money back was another

Retail PCs

Expect higher prices and fewer options when you're shopping in retail stores.

OUR DREAM MACHINE: Pentium MMX-200 with 32MB of RAM, 4GB hard disk, 12X-24X CD-ROM drive, Matrox Millennium video card with 4MB of RAM, 56-kbps modem, 17-inch monitor, internal Zip drive, standard speakers.

COMPANIES	System	Price	How close we came to our target
Circuit City San Francisco	Packard Bell R500, R7480 17-inch monitor	$2115.71	proprietary video card with 2MB of RAM, no Zip drive, inferior speakers integrated with monitor
CompuMax Winston-Salem, North Carolina	CompuMax Pentium 200	$2119	33.6-kbps modem, no Zip drive
CompUSA Natick, Massachusetts	CompUSA PC American Pro [1]	$2310.68	15-inch monitor (17-inch would increase price by $203), 33.6-kbps modem, ATI 3D Xpression+ video card
Computer City Westminster, Colorado	Sony VAIO PCV 130	$2788.73	15-inch monitor, ATI All-in-Wonder video card
OfficeMax San Francisco	Compaq Presario 4508, Panasonic 17-inch monitor	$2167.42	24MB of RAM, 3.2GB hard disk, 16X CD-ROM drive, proprietary video card with 2MB of RAM, no Zip drive

[1] Computer was never actually purchased due to canceled order.

story. Whether you return your system directly to the computer maker or bring it back to the store where you bought it, it usually costs you time and money. The only question is how much.

A key difference between mail order, online, and retail is the duration of the money-back guarantee. Direct and online vendors typically give you 30 days to return the PC for a full refund. With retail stores, it's usually one to two weeks, and you may have to pay a restocking fee.

Guarantee periods can vary within companies, too; Scott found out the hard way that CompUSA's online sales have a *10-day* return policy, not 14 days like most retail stores. Armed with the (truthful) excuse that his wife had delivered a baby the same day CompUSA delivered his computer, Scott convinced the vendor to take the PC back—but he still had to pay a 15 percent restocking fee. (CompUSA Direct doesn't normally charge a restocking fee.)

Shipping a PC back to a mail-order or online vendor means schlepping the boxes to your local shipping center or arranging for a pickup. Some companies, like Dell and Gateway, sent us prepaid shipping labels to return the systems. But all direct vendors charge you shipping costs at least one way (IBM and Micron make you pay both ways), a de facto restocking fee. We paid between $95 and $110 (and that's just one-way) for the privilege of saying no thanks.

Returning products to the stores was also a hassle. We fielded a surprising number of questions, given that all the stores boasted "no questions asked" return policies. Was the machine defective? Were you just not happy with it? Would you like something else instead? Be prepared for stores to push to keep your dollars.

Scott encountered a more unpleasant surprise when he attempted to return his Sony VAIO system to Computer City in Westminster, Colorado: a 10 percent restocking fee that's not mentioned anywhere in the company's brochures. "Manufacturers are not accepting returns anymore," announced Craig, the store manager.

When we called Computer City's head office in Fort Worth, Texas, David Martella, vice president of retail sales, told us, "Our companywide policy is to issue a full refund for desktop PCs—Mr. Spanbauer will be credited $250 immediately." He added that store managers can't arbitrarily set policies like these, and that "Craig is no longer working with us."

Most refunds for cash-on-delivery payments were promised in 18 calendar days after the returned PC arrives at the manufacturer, and Aoife got her refund from Gateway right on the 18th day. Payments by check are supposed to be reimbursed in somewhere between 10 and 14 working days; OfficeMax and Computer City were right on time, with refunds arriving exactly two weeks after the PC was returned.

Staying on top of credit card refunds took a little bit more work. Angela got refunds from Dell and Gateway two weeks from the PCs' return. IBM Direct and Internet Shopping Network took the longest to issue refunds—28 days and a whopping 46 days, respectively.

SALE AWAY

NO MATTER HOW you buy a computer, you need to do your homework first.

In addition to, ahem, reading your favorite computer magazine, going online is probably the best way to find out what's out there. But before you whip out the plastic, pick up the telephone. You'll get your questions answered faster, and you'll have a live human to talk to if things go sour.

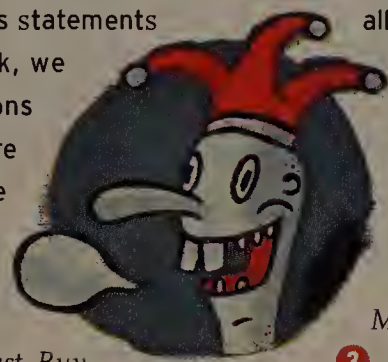
If the system you really want isn't available by mail order or online, you'll have to visit a nearby computer emporium. Local stores are generally better than chains, but in either case, get all the information in writing—especially policies on support, refunds, and restocking fees.

Our shopping extravaganza was exhausting. But you know what? We'd go through it all again, if it were our money. Honest, we would.

Aoife McEvoy is an associate editor, Angela Freeman a staff editor, Harry McCracken a senior writer, Peter Scisco a freelance writer, and Scott Spanbauer a senior associate editor for PC World. ■

Did They Really Say That?

SALES REPS SAY the darnedest things. During our day of PC shopping, we got our fair share of bizarre advice and outrageous statements from retail sales staff. Heck, we even got bad recommendations from fellow shoppers. Here are the ten dumbest things we heard along the way.



10 "You can't get an internal Zip drive because HP and Compaq bought them all." *Best Buy, Greensboro, North Carolina*

9 "You can get a RAM upgrade from 32MB to 48MB for $20." *Circuit City, Greensboro, North Carolina*

8 "This is the day the CompUSA built-to-order PC has arrived, and nobody here knows much about it." *CompUSA, Natick, Massachusetts*

7 "Compaq's software support is awful, but CompUSA will help you with any problem you have *forever*." *CompUSA, Natick, Massachusetts*

6 "For a small fee, I will personally come and help you set up your computer and make sure you're comfortable using it." *CompUSA, San Jose, California*

5 "The speed of the computer doesn't matter—it's all in the modem." *Helpful customer wearing fish-print shirt, Staples, Brighton, Massachusetts*

4 "Packard Bell isn't like other companies. It assembles components made by others on an assembly line, which is cheaper." *Circuit City, Burlington, Massachusetts*

3 "Oh, Packard Bell machines are great machines—I think they make all the components themselves." *Circuit City, San Francisco*

2 "Well, if Compaq is no longer charging $35 all the time for technical support, they sure didn't tell *me* about it." *Computer City, Pleasanton, California*

1 "Are you sure you want a monitor with your computer?" *OfficeMax, San Francisco* —A. M.

APOLOGIES
TO THE ELEPHANT
BUT WE ARE THE ON
WITH THE BEST
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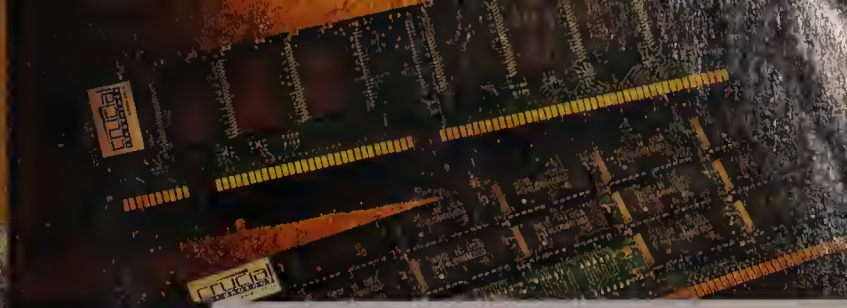

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Too Much of a Good Thing?

Loaded with Web features, the latest office suites from Microsoft, Lotus, and Corel hog your disk space and processing power. Are the trade-offs worth it?

IT'S FUNNY BUT TRUE: Business software suites are looking more and more like American cars of the 1950s. Every year the big three—Microsoft, Lotus, and Corel—roll out bigger and more powerful models that guzzle ever-increasing amounts of disk space and processor power. And every year these companies load up their products with new interface touches that are as flashy (and often as useless) as the tail fins on a '57 Caddy.

As with cars, some people just aren't happy unless they've got the latest and greatest software. On the other hand, if your old-model office suite still gets you where you want to go, is trading up worth the expense and hassle? And if you do decide to make a move, should you jump to a different suite altogether?

ILLUSTRATIONS BY DAN PICASSO

By Harry McCracken With George Campbell, Richard Jantz, Cathy Kenny, Celeste Robinson, and John Walkenbach

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Suite
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To answer these questions, we've popped the hood and crawled inside Corel's latest model, WordPerfect Suite 8 Professional, and compared it to Lotus SmartSuite 97 and Microsoft Office 97 Professional. We asked six *PC World* expert contributors to put the suites' word processors, spreadsheets, databases, presentation packages, personal information managers, and integration features through their paces.

Our authors judged not only how the suites stack up against each other but also whether each suite's apps offer enough truly useful new features to make an upgrade worthwhile—as part of a suite and on their own.

They created a formal scoring system to rate the most important features in each application. "Office Suites Report Card" shows the overall usability scores for the major applications in the suites, as well as weighted performance scores from the PC World Test Center.

Best Buy

A CONSISTENT WINNER of *PC World*'s World Class Awards, each version of Microsoft Office bursts with innovative, well-integrated features. But the latest version, Office 97 Professional, only squeaked in as our Best Buy in a tight race against Corel WordPerfect Suite 8 Professional and Lotus SmartSuite 97. This close competition was due more to the improvements we found in the Corel and Lotus products than to anything lacking in Microsoft's. Office's apps stand out on their own as well.

OFFICE 97 PRO EKES OUT A WIN

In most major apps, the competition between the suites is as tight as it's been since the dawn of Windows 95. Although there's no runaway winner, Microsoft Office 97 Professional gets our nod as Best Buy, with an overall score of 8.1 out of a possible 10. It does so largely because it includes the Twin Towers of the suite world, Word and Excel.

For the majority of users, a suite's word processor and spreadsheet are its most important applications, and Word and Excel maintain a clear lead over the competition, as does Office's Access database. Office 97 Pro also turned in relatively speedy scores in our performance tests, with a few notable exceptions such as slow filtering in Access and extremely sluggish printing in the PowerPoint presentation software. Office 97 Pro is still, overall, slower than both its predecessor, Office 95, and SmartSuite 97.

Office 97 Pro may be the strongest suite overall, but at $349 for a competitive upgrade or $599 for the full version, you will pay more for such strength, especially when compared with the lower prices for Corel WordPerfect Suite 8 Professional ($249 upgrade, $479 full) and Lotus SmartSuite 97 ($149 upgrade, $399 full).

Achieving an overall score of 7.5, SmartSuite 97 takes second place in our evaluation—quite an accomplishment considering that SmartSuite 96 was a haphazard jumble of old and new applications. SmartSuite 97 was the quickest suite overall in our tests, despite the fact that printing in its 1-2-3 spreadsheet can be absurdly slow (Excel was more than three times faster).

SmartSuite offers the excellent Freelance Graphics 97 presentation program and Organizer 97 PIM, and its workgroup tools remain the best of the bunch. This suite is also a genuine bargain: While Corel and Microsoft charge you $100 extra for Professional editions that include a database, SmartSuite 97's *standard* edition comes with Approach.

That leaves WordPerfect Suite 8 Professional in third place, with an overall score of 6.6. The product is by no means without its virtues—it includes a project manager and Web site management program, as well as Corel's trademark bounty of clip art, fonts, and other extras. But all WordPerfect Suite's major applications trailed their Lotus and Microsoft counterparts

OFFICE SUITES REPORT CARD

Microsoft Office wins, but not by much.

SUITES	OVERALL SCORES FROM USABILITY AND PERFORMANCE EVALUATIONS							
	Word processor	Spreadsheet	Database	Presentation graphics	PIM	Overall integration	Performance	Weighted score
Corel WordPerfect Suite 8 Professional	6.4	6.9	7	8.1	5.6	6.7	5.9	6.6
Lotus SmartSuite 97	6.8	7.5	7.2	8.7	6.7	7.6	9.6	7.5
Microsoft Office 97 Professional*	7.5	8.8	8.6	8.6	6.6	7.6	9.4	8.1
Weight value by application usage (percent)	30%	25%	10%	10%	10%	5%	10%	

*Best Buy

Rated on a scale of 1 to 10; 10 is best. We took the overall scores from each application report card, then weighted them to reflect the greater importance of the most frequently used suite apps. To these we added overall PC World Test Center performance scores weighted at 10 percent to get a final score.

in our usability tests, albeit not by huge margins. More distressing, our weighted performance results indicate that WordPerfect Suite 8 Professional is the slowest suite overall, and printing is much slower than in the previous version.

The differences between the suites are rarely dramatic, as shown in the evaluation summaries ("What We Found") and report cards in the reviews that follow. If you're already comfortable with any of the three suites (or if you buy a PC that comes with one preinstalled), switching to another probably isn't worth the bother. You might miss out on some nifty features, but you'll also avoid dealing with an unfamiliar interface and incompatible file formats.

THE PROS AND CONS OF UPGRADING

So much for how the three suites compare to each other. Do the new versions offer enough substance to justify upgrading from their predecessors? If you're using your suite to create HTML pages or other material for the World Wide Web, the answer is an easy yes. All three vendors have made a major push to beef up the Internet features of the latest suites, with good results. In fact, Corel bundles Netscape Communicator Suite as well.

If you're not an avid Net-head, upgrading is a tougher call—and a big part of your decision will depend on which applications you use. Among the major suite apps, Office's Word and Access and WordPerfect Suite's WordPerfect, Quattro Pro, and Paradox are all notably improved in their current incarnations.

In SmartSuite, Word Pro 97 is much faster than the snail-paced Word Pro 96, and 1-2-3 is finally a true Windows 95 program with an interface that's reasonably consistent with the rest of the suite. If you're a heavy user of any of these programs, you'll likely find that a suite upgrade is worth the money and effort.

There's one vital point to consider before upgrading: It may not pay to do so until *everybody* in your organization—or your business's key client base—is ready to make the switch. WordPerfect Suite 8's applications, blessedly, retain the file formats of their version 7 and 6.1 predecessors, making it relatively easy to share documents with coworkers who haven't upgraded. But Office 97 introduces new formats for all its major programs, and SmartSuite 97 does so for most of them. (The first version of Office 97, in fact, did not even offer a true filter for Word 95 files. With egg on its face, Microsoft obliged outraged customers with a Word 97 patch to save files in Word 95 format, and current versions of Office 97 now include this patch.)

If any of your colleagues are still using an older suite, there's no surer way to irritate them than by sending them documents saved in new file formats they can't open. You can always save in the older formats, but this may mean sacrificing some of the new formatting features that led you to upgrade in the first place.

Still not sure about the benefits of the current suites? You can always sit back and see what the future holds. At press time Lotus introduced an updated version of SmartSuite 97 that adds speech recognition dictation within Word Pro—complete with microphone and headphones—at no increase in price. (This is the version now available in stores.)

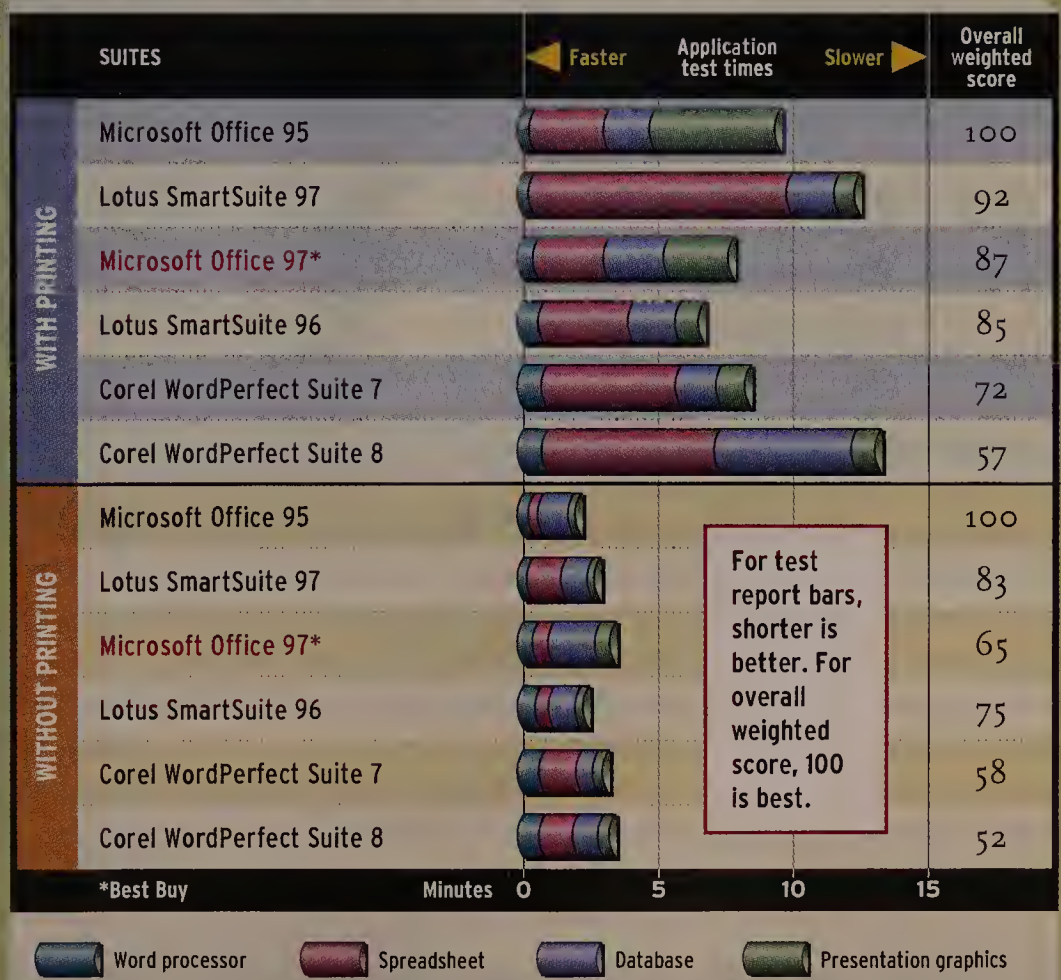
Microsoft, meanwhile, is planning to ship a new version of Office 97's Outlook PIM in the first half of this year, before the next version of Office arrives. And by the end of the year, all three suites are due to undergo complete renovations (see "Suites 98: What You Can Expect in the Next Versions").

With so much change in the air, the office suite races are likely to heat up in the coming months. But ultimately, the best suite is not necessarily the one with the biggest tail fins. It's the one that you feel the most comfortable driving. ▶

TEST REPORT

Office 95 Is Still Fastest

The new suites are slower—especially when printing.



HOW WE TEST Stopwatch tests were conducted on a Micron Millennia Pentium-90 PC with 16MB of RAM, 256KB of secondary cache, a 2.5GB hard disk, and a Diamond Stealth 64 graphics controller with 2MB of RAM; and on an NEC Ready 9716 Pentium MMX-200 system with 32MB of RAM, 256KB of secondary cache, a 3.2GB IDE hard disk, and an integrated graphics controller with 2MB of RAM. The overall score is the sum of the normalized and weighted time that each suite's applications took to complete their respective tasks: word processing (40 percent), spreadsheet (30 percent), database (15 percent), and presentation graphics (15 percent). The best-performing suite is assigned an overall score of 100. Data based on tests performed by the PC World Test Center. All rights reserved. For further details, visit www.pcworld.com/feb98/suites.

War of the Words

Corel WordPerfect 8, Lotus Word Pro 97, Microsoft Word 97

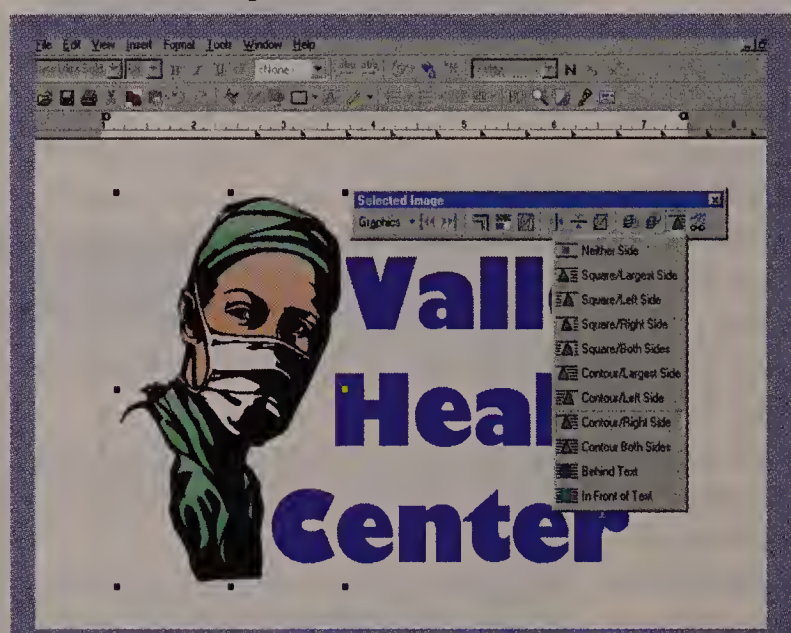
WORD PROCESSORS have more bells and whistles than a New Year's parade. But odds are you use only about 15 percent of these features. So we focused on key elements such as editing and formatting, workgroup tools, automation, and help. Microsoft Word 97 led the pack.

WHAT WE FOUND

Look and Feel: Both Word and WordPerfect have intelligently designed menus, though some commands seem out of place. For example, Word puts the Page Setup command in the File menu instead of in Format. (Hedging its bets, WordPerfect puts it in both places.) Word Pro goes its own way, placing the Scripts and Macros commands in the Edit menu and the Page Layout commands in the Text menu.

Accordingly, the ability to customize menus and toolbars so they make sense to you is essential. The versatile user customization of Word's menus, toolbars, and keystroke shortcuts continue to be the most intuitive and flexible. Still, it would be nice to have the appropriate toolbar appear as you're working on an object such as a graphic, then disappear when you move on to something else. WordPerfect's new context-sensitive "floating" Property Bar does this. Word Pro's InfoBox is similar but is intrusively placed in the editing window.

Editing: Word's editing tools are the best and most intuitive. Word Pro's text and object selection is not as flexible as Word's—for example, it makes you go through a number of steps to select an entire document, while Word lets you do this by simply triple-clicking or using a keyboard shortcut. And Word 97 can now fix multiple-word errors in its AutoCorrect mode—changing, say, 'asthe' to 'as the'. The other two word processors can't. WordPerfect's thesaurus, however, is slightly better and more flexible than those in either Word or Word Pro.



WORDPERFECT'S new floating Property Bar provides the exact commands you need to work with the object you've selected.

Formatting: Word's multilevel Style dialog box makes it easy to change fonts, colors, and columns instantly. WordPerfect still makes you use awkward menus and codes to manually modify styles, while Word Pro won't let you alter its style sheets. Word's truly automated formatting feature can take a simple text file and format it in a single pass. (It's great for cleaning up e-mail.) While all three packages let you create frames to hold text or graphics, Word and Word Pro allow you to flow text from one frame to another—essential for creating newsletters.

With all three word processors, you can now create HTML documents as well as edit existing Web pages. But Word again does it slightly better, putting its HTML editing tools both in the main drop-down menus and in a palette of tools.

Workgroup Tools: Word Pro provides the most complete set of tools for assigning permissions and tasks to a group. Word and WordPerfect take a simpler approach: They use colored type to indicate who's done an edit, but rely on normal network administration tools to regulate file sharing. While Word deserves kudos for its new Document Map view, which lets you jump to any part of a document by clicking a selected heading, Word Pro's multiple thumbnail-style views of documents still allow easier maneuvering.

Automation and Help: While Word has wizards, WordPerfect's new PerfectExpert straddles your document window and gives you step-by-step buttons to automate a job. Word Pro's SmartMasters let you click on placeholders to enter text and objects, but it lacks the hand-holding features of the other two.

In addition to online help, each package can link to additional assistance on a Web site. Word's intuitive multiple-choice organization on the Web is best.

WORTH AN UPGRADE?

Word 97 and WordPerfect 8 have undergone the most changes—particularly in their implementation of HTML editing tools and Web access—while Word Pro 97 has changed the least. The new features in each word processor are not substantial enough to warrant switching from one word processor to another.

REPORT CARD

WORD PROCESSORS	Look and feel	Editing	Formatting	Workgroup tools	Automation and help	Final score (10 is best)
Corel WordPerfect	6.9	7.1	6.9	6.9	6.8	6.4
Lotus Word Pro	5.4	6.2	6.3	8	6.2	6.8
Microsoft Word	7.4	7.8	7.1	7.2	8	7.5

The Numbers Racket

Microsoft Excel 97, Lotus 1-2-3 97, Corel Quattro Pro 8

THE DEVIL IS IN the details—and that's especially true of these three spreadsheets. Though they're all amazingly similar, Microsoft Excel gets our nod thanks to its detailed analysis tools, near-flawless formatting, and customizability.

WHAT WE FOUND

Analysis Tools: Nothing beats Microsoft Excel at analysis, though Corel's Quattro Pro runs a close second. Excel has a terrific assortment of worksheet functions (but not as many as Quattro Pro), and users with specific needs can load the included Analysis ToolPak add-in for even more. If you like to slice and dice your data, you'll find no substitute for Excel's dynamic pivot table ability. Quattro Pro's cross-tab feature works fine, but if your data changes you must create a new cross-tab.

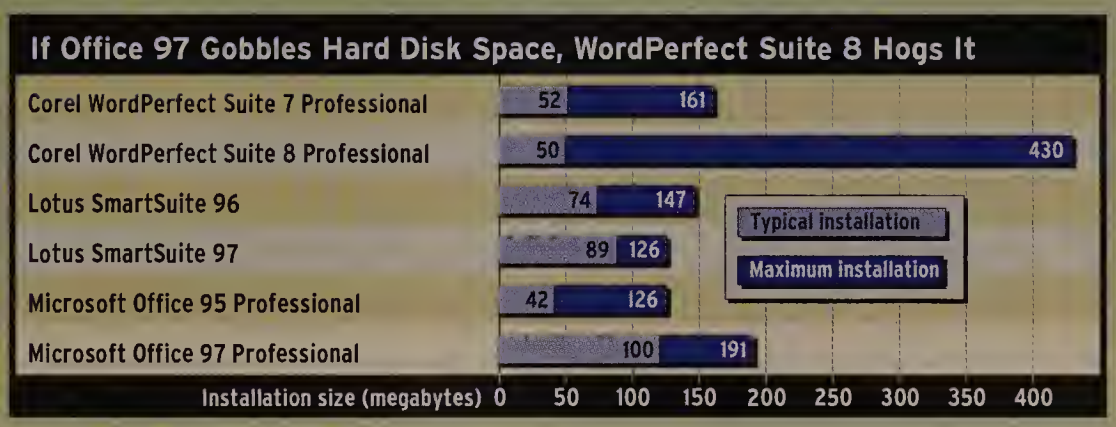
Lotus has scuttled 1-2-3 97's previous way of working with spreadsheet databases and replaced it with a less intuitive method that uses an OLE connection to Approach. While 1-2-3's new database feature is useful, it's often overkill and can cause serious delays while Approach launches in the background.

Formatting and Presentation: All three products can turn even mundane spreadsheet data into a boardroom extravaganza, but Excel really excels. Both it and Quattro Pro let you merge a range of cells into a single unit—perfect for setting up titles. Of all three spreadsheets, 1-2-3 is the only one that doesn't let you create custom number formats. Each of the three produces great-looking charts, but only Quattro Pro's Chart Advisor makes it easy to create the correct type of chart with the proper look; a unique mini-presentation feature allows you to quickly set up a series of text slides and charts. Lotus 1-2-3's charting is vastly improved from previous versions, and with its new InfoBox you can easily customize charts. All three can write HTML files, but Excel alone can also save charts in HTML format. ▶

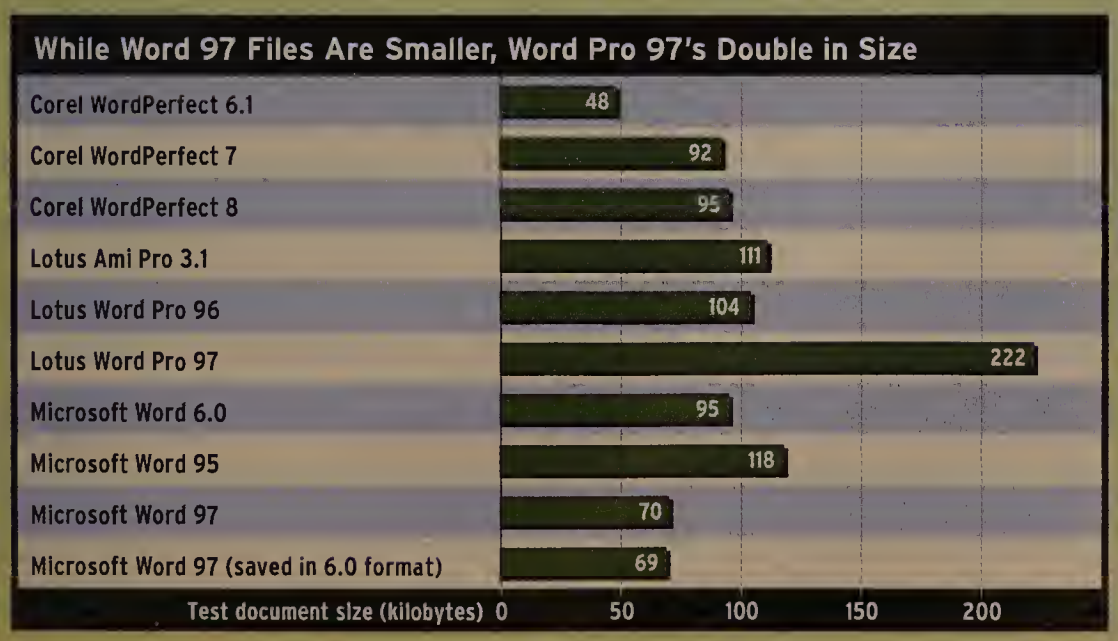
Bloatware

Office Suites Keep Growing and Growing...

YES, SUITES are getting more and more powerful. But they're also grabbing bigger chunks of hard drive space and generating larger files. We compared each suite's typical and maximum hard disk space requirements to the previous version's. The full Corel 8 is gargantuan, at more than 400MB—and that's not including extra fonts and clip art. Lotus's smaller SmartSuite 97—only 126MB—was the exception.



...and Their Documents Are Getting Bigger, Too.



We also compared the size of a word processing file produced by each suite's last two versions. We produced a test document by importing a 15K text file, inserting a 30K TIFF image, and adding font and paragraph formatting. We saved the file in the program's native format, using each version's default settings. Lotus Word Pro 97 was the biggest hard disk hog, producing files more than double the size of ones created in Word Pro 96. Corel WordPerfect 8 remains close to its previous version. The only surprise was Word 97's amazing *decrease* in file size from those of its previous two versions.

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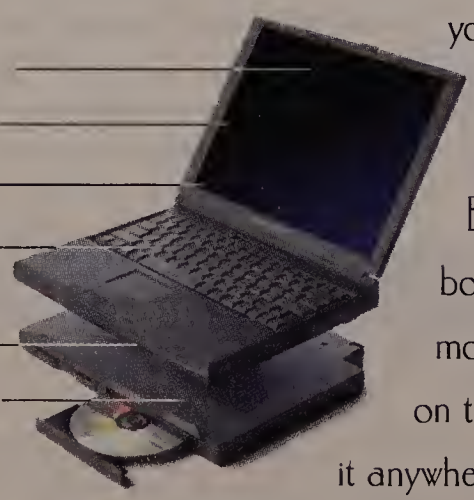

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MMX™ intel inside pentium PROCESSOR

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**All x2 products are capable of 56Kbps downloads; however, due to FCC regulations which restrict power output, current download speeds are limited to 53Kbps. Model shown is 8560 and specs quoted apply to that model. Specifications and availability subject to change without notice.

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Customizability: Generally, Excel and 1-2-3 offer similar tools for creating applications—a script editor, a dialog box editor, and even the ability to create custom worksheet functions and add-ins. In this area, Quattro Pro remains crude. All three products allow you to modify the toolbars and create new ones—although 1-2-3 makes it more difficult than it should be. Excel is unique in its ability to let you modify the menu bars as well.

Workgroup Tools: In many ways, Lotus 1-2-3 does the best job of helping you collaborate, with comprehensive tools for reviewing and consolidating across the workgroup. With Quattro Pro's new Version Control, you can save successive versions of a file without having to change its name each time. This lets you return to a previous version if you mess up the current one. Only Excel lets you track changes made to a workbook—similar to the document management features found in most word processors.

For scenario management, there is simply no substitute for 1-2-3's slick Version Manager. Excel is particularly weak, since it limits a scenario to just 32 cells. Excel and Quattro Pro do include a few tools to help you audit your work, however. For example, you can quickly identify all cells used in a formula, or identify all formulas that use a particular cell. Overall, though, all three are lacking in this area.

Automation and Help: Built-in on-screen help is generally excellent in all three spreadsheets. Excel has its animated Office Assistant (you either love it or hate it), and Quattro Pro has its PerfectExpert. Both accept plain-English questions and display a list of relevant topics. Overall, Excel seems to provide the most relevant and context-sensitive help.

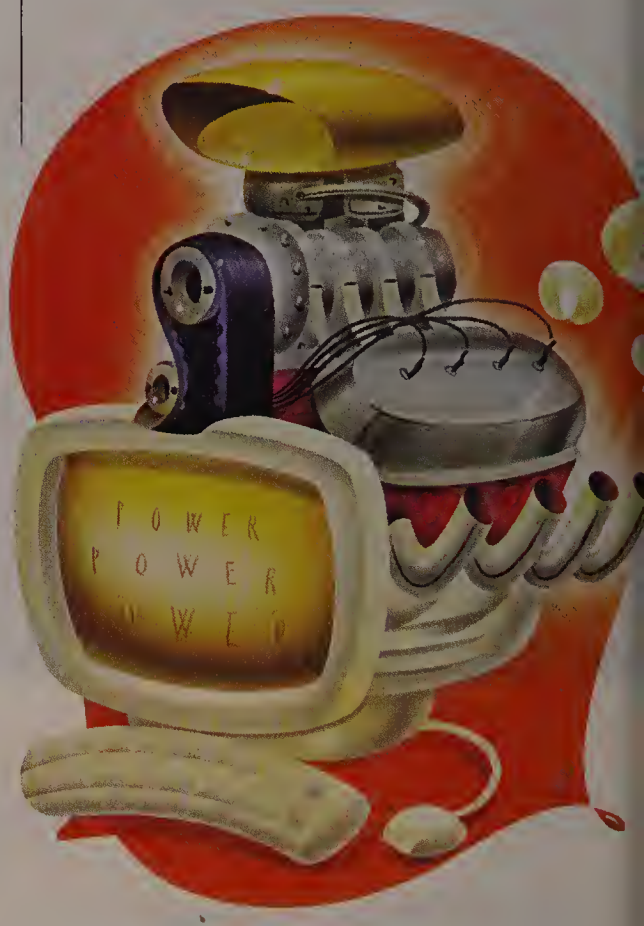
All three make it fairly easy for a novice user to record and play back simple macros. The Macros recorded in 1-2-3, however, play back only in the original workbook; if you'd like a macro to work in a different workbook, you need to manually edit the LotusScript code.

REPORT CARD

SPREADSHEETS	Analysis tools	Formatting/ presentation	Customiza- bility	Workgroup tools	Automation and help	Final score (10 is best)
Corel Quattro Pro	7.2	8.9	1.4	7.7	9.1	6.9
Lotus 1-2-3	4.5	8.1	7.9	7.7	9.1	7.5
Microsoft Excel	8.3	9.9	9.8	6.9	9.1	8.8

WORTH AN UPGRADE?

Corel Quattro Pro qualifies for the "most improved" award, so it may offer the most bang for the upgrade buck. There's one big reason that existing users of Lotus 1-2-3 96 might want to upgrade: It's the first native 32-bit version for Windows 95. For new users, though, Excel is the way to go because it has become the de facto standard among spreadsheet users and offers the best on-screen help.



Duel of the Databases

Microsoft Access 97, Lotus Approach 97, Corel Paradox 8

DATABASES HAVE ALWAYS been the suite applications with the steepest learning curve. With each new version, even database veterans have to take a deep breath and start learning again. Microsoft Access 97 scores big for its power and flexibility at all user levels.

WHAT WE FOUND

Tables: All the database managers have helpers that will create an entire database, complete with tables, forms, reports, and a customized interface to help you navigate these objects. Overall, Lotus Approach 97 is the best in this category. Its SmartMaster databases aren't as varied as the ones that Microsoft Access 97 can create, but Approach has the most approachable tools for adding data entry checks to tables. Though Corel's Paradox does well in data checking, it loses points for its ugly table-design window.

REPORT CARD

DATABASES	Tables	Forms and reports	Database querying	Integration/ data sharing	Automation and help	Final score (10 is best)
Corel Paradox	7.1	7.5	7	9	4.5	7
Lotus Approach	8	8	7	6.5	6.5	7.2
Microsoft Access	7.8	8.5	9	10	7.5	8.6

Forms and Reports: The biggest challenge with these data managers is creating views with data from more than one table at the same time. Access 97 has the best tools for stepping you through this process. Its Form and Report Wizards have many options for organizing data. Approach and Paradox also offer assistance with this type of task, but they don't give you the same level of flexibility you get from Access. However, Access doesn't do as well as the other two in handling changes to field names or in adding fields to documents after they are created, but the sheer power of its wizards outweigh this fault.

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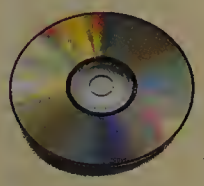

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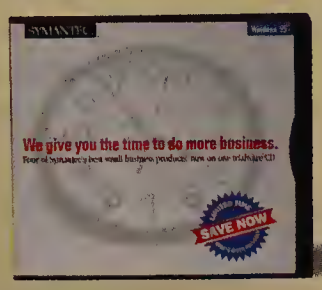

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Database Querying: All three databases give you decent tools for finding records and creating filtered views of data, but each is strong in a different area. Access has the most options for filtering records (limiting those you are viewing to match some set of criteria). Both Approach and Access have lots of automated helpers for special-purpose queries such as finding unique records. And Paradox excels with the versatile ways it lets you use filters and queries with forms and reports. Paradox has few automated helpers, however, which makes it the least user-friendly.

Integration and Data Sharing: Access 97 has the best overall mix of integration tools. Its Publish to the Web Wizard offers more options than the comparable tools of the other two applications. Paradox comes in second with great links to both WordPerfect and Word. Surprisingly, Approach—part of the most workgroup-friendly suite—can't do a true mail merge with a word processor and has only limited help for publishing Web data, ultimately resulting in its low score here.

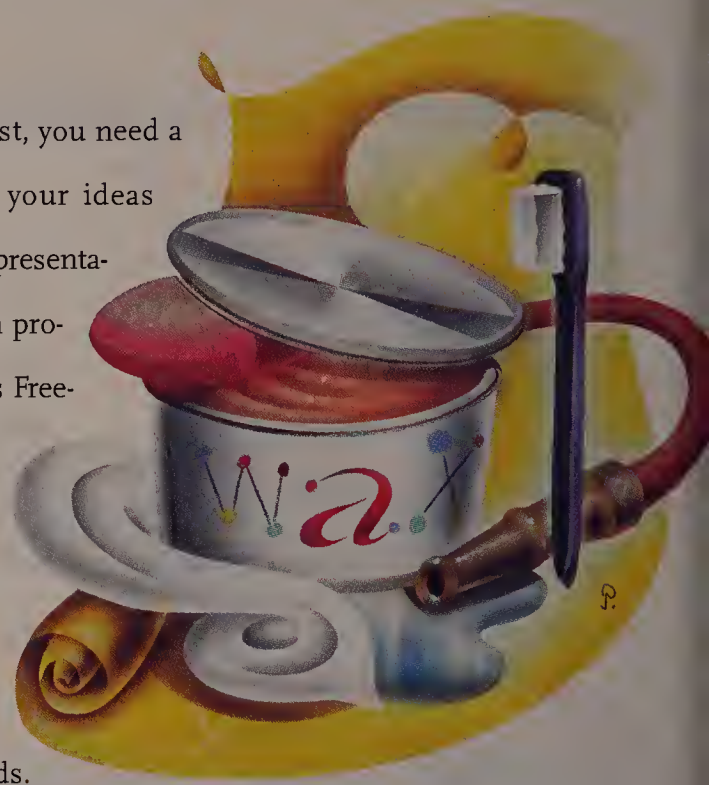
Automation and Help: Access offers the best help with creating command buttons and "switchboards" to navigate between database tasks. Approach has a great macro builder and is the only program of the three that lets you record your keystrokes to a macro or script. Paradox came in lowest, mainly because it has no macro capability at all. Each database has automated task helpers, but Access's wizards offer just the right combination of assistance and flexibility.

WORTH AN UPGRADE?

If you're maintaining data for the Web, each package's new Web-enabled features alone make an upgrade worthwhile. Even if you're not publishing data to the Web, each of the three programs is rounded out with a mix of new features that make it easier to use. The overall best database package, though, is Microsoft Access 97. Its new features, power, and versatility make it a worthy upgrade.

Presentations Face-Off

Corel Presentations 8, Lotus Freelance Graphics 97, Microsoft PowerPoint 97



WHEN YOU WANT to look your best, you need a software package that helps put your ideas together into a professional-looking presentation. All three of these presentation programs are up to the task, but Lotus's Freelance Graphics 97 offers a few more tricks and implements them better.

WHAT WE FOUND

Creating: Sure, Microsoft PowerPoint has a parade of page layouts, and Corel Presentations provides a bevy of beautiful backgrounds. But Lotus Freelance Graphics has superior step-by-step content wizards, as well as the best canned content for the largest number of topics—including business plans, marketing scenarios, and many more. Freelance's ready-to-go presentations are also the most customizable and helpful.

POWERPOINT 97's abundance of toolbars can overwhelm first-timers until they learn what tools go with each task.

Editing: Corel Presentations' Property Bar and Freelance Graphics' InfoBox streamline mundane editing tasks by providing formatting options in a single box. Both are faster and easier to use than PowerPoint's plethora of toolbars. PowerPoint, however, is the only package with a useful proofing tool for visual clarity (to ensure readability). Nevertheless, Freelance Graphics' unique diagramming tools—ready-made shapes with smart connectors—and live preview of data charts give it a slight advantage in editing.

Readying the Show: PowerPoint and Presentations provide you with the most control over slide transitions and multimedia effects. But Freelance Graphics' unique TeamReview workgroup tools give it the edge, making it easy for reviewers to attach comments to a presentation using the built-in annotation and drawing tools. Corel Presentations lacks a rehearsal mode for practicing and timing a show—a standard feature of both the Microsoft and Lotus products. ▶

REPORT CARD

PRESENTATIONS	Creating	Editing	Readying the show	Delivering	Automation and help	Final score (10 is best)
Corel Presentations	8	9	5	9.5	9.5	8.1
Lotus Freelance Graphics	8.5	9.3	9	7.3	9	8.7
Microsoft PowerPoint	7.5	8.5	8	9.5	9.5	8.6

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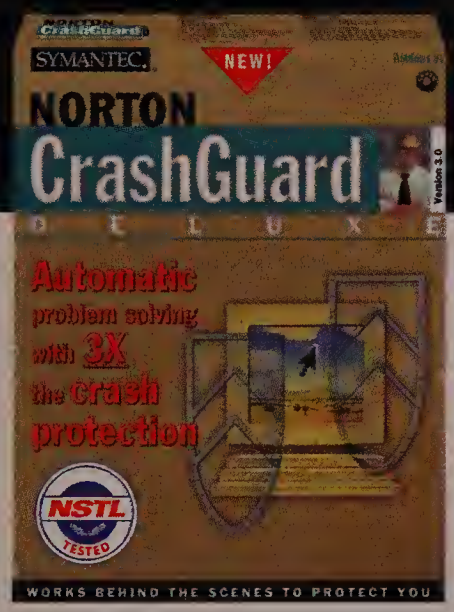

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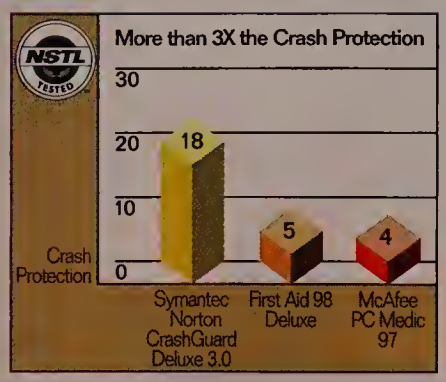

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Delivering: Both Presentations and PowerPoint provide more options for distribution on the Web. Corel also offers the most printing options, including named settings, two-sided printing, multiple resolutions, a shift for binding, and more. Adding multimedia elements is easiest in PowerPoint thanks to its Animation Effects toolbar and other options.

Automation and Help: Freelance Graphics' simple interface distinguishes it from the other two, which occasionally suffer from toolbar overload. Each program has its own supply of automated tasks and customizable features, and on-screen help and Web support are about equal for each.

WORTH AN UPGRADE?

Freelance Graphics is the best bet for canned or collaborative presentations, PowerPoint is tops at multimedia glitter, and Presentations has the best Web smarts.

PIM Possibilities

CorelCentral, Lotus Organizer 97, Microsoft Outlook 97

PERSONAL INFORMATION MANAGERS used to be the Rodney Dangerfield of office suites—bundled add-ons that didn't get much respect. Alas, it still appears impossible to build a PIM that will please everyone. For basic management of a personal calendar and address book, Lotus's Organizer 97 is the clear winner, combining the friendliest interface with many sophisticated tools.

WHAT WE FOUND

Calendar: Organizer's slick calendar works like a bionic Filofax. Its interface mimics the familiar tabbed sections and spiral-bound pages of a paper planner, and you also get powerful tools such as call logging, search filters, and the ability to quickly link contact information and external files to an appointment. By contrast, CorelCentral's and Microsoft Outlook's calendars are hobbled by poor design. And Corel mixes strange omissions (there's no way to search your calendar) with needless complexity (it puts a full complement of HTML editing tools in the dialog box you use to enter an appointment).

Address Book: Organizer's address book is as simple to master as its ▶

REPORT CARD

PIMS	Calendar	Address book	Other information	Final score (10 is best)
CorelCentral	5	6.5	5.3	5.6
Lotus Organizer	8.5	8	3.3	6.7
Microsoft Outlook	7	6.8	6	6.6

Suites 98

What You Can Expect in the Next Versions

CURRENT SUITES are overflowing with robust features. But that doesn't stop Corel, Lotus, and Microsoft from refining items included now and adding yet more. So what's a suite to do when it seems to have done it all?

The big three vendors say that for the next versions of their suites, they will move away from feature *quantity* and focus instead on feature *quality* and ease of use. Expected enhancements include network management tools, small specialized applets or file utilities, and the usual suspects: better integration and faster speed.

Microsoft's main focus for the still unnamed next version of Office is on minimizing software deployment and maintenance hassles for both network administrators and end users. Planned features include self-repairing files that will automatically reinstall themselves if they become corrupted or are accidentally deleted. Automatic updates will notify users (through either the corporate intranet or the Web) of product updates, which can then be downloaded automatically. And you'll be able to put user preferences on a network server, which can be accessed from any PC. The planned ship date is third or fourth quarter of this year.

Lotus has similar plans to add network management tools to SmartSuite 98, but details at press time were sketchy. The company's primary focus is to incorporate its Kona technology into the next version. Kona consists of Java applets that are similar in concept to Lotus's Components. The idea is that if you spend most of your time in a word processor and only occasionally need to work with numbers, you can launch a simple spreadsheet applet from within Word Pro and then manipulate the numbers directly from the Word Pro document. Applets will include a word processing module, spreadsheet, chart tool, calendar, and project scheduler. Expected features include improved HTML support and conversion capabilities, as well as bidirectional compatibility between SmartSuite 98 and Office 97 documents. SmartSuite 98 is expected to ship sometime in the first half of this year.

Corel was in the preliminary planning stages of WordPerfect Suite 9 at press time, so it was unable to provide many concrete details. Most of the enhancements will focus on improved integration and performance. The company will soon release the Enterprise Edition of WordPerfect Suite 8, which uses Java technology to allow the software to run on multiple platforms, including Windows, Macintosh, and UNIX. —Cathy Kenny

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FAX: 702-352-1615
www.ricohcpg.com

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8096 Transcanada Highway
Montreal, Quebec H4S 1M5
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calendar, and it has the same straightforward linking and search options. However, the tools for altering the address book's predefined fields are limited. The reverse is true in Outlook: The address book is infinitely customizable, but screens tend to be crammed with an intimidating array of buttons, icons, and other clutter, and figuring out how to change the defaults can require programmer-like skills. While CorelCentral has a much cleaner look and many nice touches (you can view both your address book and calendar on a single screen), it's the weakest PIM at basic tasks such as importing and printing.

Managing Other Information: Outlook brims with inventive tools, including e-mail features, sticky notes, and the Journal, which tracks documents created elsewhere in the Office 97 suite. But they're too often laden with controls and options that are anything but intuitive. CorelCentral is more inviting and handles Internet e-mail well with a built-in version of Netscape's excellent Messenger client (the rest of the Communicator Web suite is there, too). It also has a very handy minidatabase with templates for cataloging everything from office inventories to coin collections. Organizer provides few tools beyond its calendar and address book, and SmartSuite owners must pay $15 to upgrade to a version with workgroup scheduling.

WORTH AN UPGRADE?

None of these PIMs are big reasons in themselves to upgrade your entire suite. Organizer 97, which differs little from its immediate predecessor, is also available as a stand-alone package. CorelCentral and Outlook, although promising, would both benefit mightily from another revision that works out some of their kinks.

Suite Integration

Corel Application Director, Lotus SmartCenter, Microsoft Binder

WHEN APPS WORK together seamlessly and share a consistent look-and-feel across the board—that's integration. Microsoft Binder and Lotus SmartCenter do it equally well.

WHAT WE FOUND

Common Interface: Each suite offers consistent menus and toolbars, but that's where the similarities end. All three use different dialog boxes to perform the same tasks in the various applications. Even high-scoring Microsoft Office uses different spelling-checker dialog boxes in Word, Excel, and PowerPoint. But Office still has a broad number of features that stay consistent across its applications. Both Lotus SmartSuite's and Corel WordPerfect Suite's apps don't share nearly as many tools as Office's does.

Sharing Data: SmartSuite excels with its superior handling of data exchange and its exceptional SmartCenter desktop management tool. It integrates tightly with the Internet, as well as with calendars, address books, and reference tools. Office's underappreciated Binder is still an excellent utility for pulling together information from multiple applications into a single file. WordPerfect Suite still doesn't offer either the quality or quantity of integration tools found in its competitors.

Automation and Help: What sets SmartSuite apart is its SuiteHelp, which provides step-by-step instructions on using the applications *together*. SmartSuite also stands out for its context-sensitive help. By comparison, both Office and WordPerfect Suite suffered from a lack of cohesiveness and context sensitivity: In most cases, asking for help in performing a cross-app task is fruitless.

REPORT CARD

INTEGRATION	Common interface	Sharing data	Automation and help	Final score (10 is best)
Corel App. Director	7.4	6.1	6.5	6.7
Lotus SmartCenter	6.9	8	7.9	7.6
Microsoft Binder	8.4	7.4	7	7.6

WORTH AN UPGRADE?

If you're looking for a tool to pull together disparate files into a single location, Microsoft Office with its Binder integrator is your best bet. If you're sure to need an extra helping hand, or if you plan on creating cross-application documents, then SmartSuite is the one for you.

Harry McCracken is senior writer for PC World. *George Campbell, Celeste Robinson, and John Walkenbach are contributing editors for* PC World. *Richard Jantz and Cathy Kenny are freelance writers.* ■

OFFICE SUITES AT A GLANCE

Microsoft Office 97 Professional
Main apps: Word 97, Excel 97, Access 97, PowerPoint 97, Outlook 97
Microsoft Corp., 800/426-9400, www.microsoft.com
List price: $599, upgrade $349
READER SERVICE NO. 755

Lotus SmartSuite 97
Main apps: Word Pro 97, 1-2-3 97, Approach 97, Freelance Graphics 97, Organizer 97
Lotus Development Corp., 800/353-5414, www.lotus.com
List price: $399, upgrade $149
READER SERVICE NO. 756

Corel WordPerfect Suite 8 Professional
Main apps: WordPerfect 8, Quattro Pro 8, Paradox 8, Presentations 8, CorelCentral with Netscape Communicator
Corel Corp., 800/772-6735, www.corel.com, www.wordperfect.com
List price: $479, upgrade $249
READER SERVICE NO. 757

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Objective Provide businesses with high-performance, reliable PCs that include unique advanced support features like QSentry Technology.

MAJOR ACCOMPLISHMENT

The successful incorporation of QSentry Technology, a unique, customized PC health monitoring and support technology (based on Intel's LANDesk Client Manager V.3.1) into all Quantex desktops. This exciting technology:

- Maintains inventory of system hardware and software
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- Pinpoints problems and informs users of possible troubleshooting remedies to consider
- Reduces a business's total cost of ownership by eliminating costly downtime and lost productivity
- Supports industry initiatives and standards: Wired for Management, DMI-2.0, SNMP
- Simplifies local and remote network management of desktop client PCs

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Winner of *Computer Shopper's* 1997 Direct Channel Achievement Award
Chosen over all other direct vendors including Gateway, Dell and Micron, Quantex took home *Computer Shopper's* 1997 Award for Systems. This prestigious award recognizes Quantex's commitment to providing customers with high-performance systems at competitive prices and backing them with a solid business support package.

Winner of *PC Computing's* 1997 Most Valuable Product Award
Beating out industry-leading competition, Quantex took home the esteemed 1997 *PC Computing* MVP Award. Quantex was awarded this honor after *PC Computing's* editors conducted an exhaustive review of thousands of computer hardware and software products, evaluating them for usability, performance, technology, innovation and value.

Winner of *PC Magazine's* Editors' Choice Award - QP5/233 M-3
In December 1997, Quantex's QP5/233 M-3 grabbed *PC Magazine's* coveted Editors' Choice Award. This award recognized our ability to deliver systems with the highest levels of reliability, cutting-edge performance and overall value.

In the last three months of 1997 alone, Quantex has accumulated **6 Best Buy** awards from *PC World*, a **PowerUser's Bargain** recommendation from *Windows Magazine*, a **Buy It!** from *C-Net Online*, a **Best Desktops 1997** selection from *NetBuyer*, an **Honorable Mention** from *PC Magazine*, a **Lab Runner-Up** award from *Home PC* and an **Editors' Choice** award from *PC Magazine (U.K.)*.

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1. Hundreds of thousands of satisfied Quantex customers
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3. The Quantex web site at www.quantex.com

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At Quantex, we take great measures to bring our customers the latest technology and products as soon as they become available. By presenting us with the 1997 Direct Channel Achievement Award for Systems, *Computer Shopper* agreed: "Quantex continues to be a trendsetter by being among the first to market with new CPUs and chipsets, as well as introducing cutting-edge technologies."

Overall Rankings
Technical Support Survey

PC VENDOR	GRADE
Quantex	Excellent
Dell	
IBM	
Compaq	Good
Gateway 2000	
Micron	
Acer	Fair
Toshiba	
Digital	Poor
Packard Bell	

Windows Magazine, 8/97

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From pre-sale consulting to post-sale assistance, we're behind you every step of the way. With a complete warranty and service program created for our business customers and our toll-free technical support extended to 24-hours daily, we're proud to offer one of the highest rated support packages in the industry. In a recent customer survey, we were rated "Excellent" for our ability to handle technical problems quickly and inexpensively, and we excelled with a 91% "buy again" rating.

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Quantex	91%
IBM	89%
Micron	81%
Gateway	80%
Acer	74%
Digital	69%
Toshiba	61%
Compaq	58%
Packard Bell	51%

Windows Magazine, 8/97

Quality and Industry-Wide Certification

With name-brand components and the stability of Microsoft's Windows NT operating system, select Quantex systems come with rock-solid reliability "built-in." Each is designed to function as either a stand-alone or as part of a network with complete NT and Novell certification. All desktops are individually tested and inspected before shipment from our ISO 9002 certified factory. And PC '97 certification guarantees their performance with the next generation of hardware and software.

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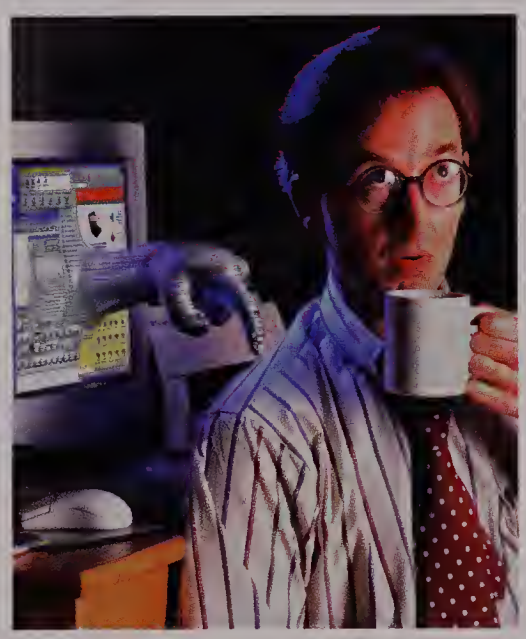

QSentry Technology is like having a full-time tech expert in your Quantex PC, alerting you to possible hardware problems before they become critical.

Products that instill a sense of security

Our promise to you and your business extends well beyond our competitive prices. Selecting Quantex means your company will benefit from a broad range of reliable, high-performance systems. By including Windows NT, Microsoft's most powerful business desktop operating system, we increase productivity and reduce computing costs in businesses of all sizes. Windows NT also enables companies to run the latest, most powerful 32-bit multimedia and productivity applications up to 24% faster than they could with Windows 95. Enhancements like Pentium® II processors, AGP technology and Ultra ATA hard drives provide lightning fast performance on all intensive applications. No other machine provides world-class performance and reliability like a Quantex does.

QSentry Technology that provides peace of mind

Now incorporated into our business desktops, our new QSentry Technology allows us to take PC support to yet a higher level. This unique, customized PC health monitoring and support technology automatically detects potential hardware problems and notifies users, so hazards can be remedied before it is too late. By decreasing costly downtime and increasing productivity, QSentry Technology helps to reduce the total cost of PC ownership. It also ensures that our systems are compatible with industry standards and initiatives such as Wired for Management and DMI 2.0.

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Every Quantex system is backed by our #1-rated, award-winning warranty and service package, specifically designed for growing businesses. It encompasses everything from pre-sale consulting to post-sale assistance and includes 24-hour/7-day toll-free technical support, express parts replacement, on-site service* and an optional 3-year extended warranty program. With all of this behind you, you're free to focus on more important things - like your bottom line.

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In order to provide our customers with a lower total cost of PC ownership, we offer a lot more than simply an attractive price. We give our business customers extras like expert business consulting to assist in choosing the right solutions, an award-winning service and support package, QSentry Technology, online ordering, business leasing, volume discounts, fax-back services and more. All of this, in addition to our reliable, high-performance systems, makes up the outstanding value that you can only get from Quantex.

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- 24X Max EIDE CD-ROM Drive
- Quantex Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 95 with MS Plus
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- 24-hr./7-day Technical Support
- QSentry Technology (Including Intel LANDesk Client Manager V.3.1)

QP5/200 SB-1 (with MMX™ Technology). . $1149
QP5/233 SB-1 (with MMX™ Technology). . $1199

QP6/233 SB-2 (featuring Pentium® II processor) $1699

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- Quantex Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95 with MS Plus
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- 64MB SDRAM Memory / 512KB Secondary Cache
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- 128-bit Riva 128 3D AGP Graphics Card with 4MB SGRAM
- 17" Digital Monitor (16" viewable)
- Choice of 3COM PCI 10/100 Fast EtherLink XL w/RJ-45 or K56flex protocol Fax/Modem*
- 32X Max EIDE CD-ROM Drive
- ATX Case
- 104-Key Keyboard with MS IntelliMouse
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QP6/233 SB-3 (w/ Pentium® II Processor). . $1949
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- 32X Max EIDE CD-ROM Drive
- ATX Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- MS Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
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QP6/266 SB-4 (w/ Pentium® II Processor). . . $2349

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- 2GB HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem*
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- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 95
- Corel Office Suite 8
- Carrying Case
- 24-hr./7-day Technical Support
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- 1-year parts and labor limited warranty on all other components

H 1210 w/166MHz Pentium® processor w/MMX™ Technology.....$2299

Quantex H 1211 (with MMX™ Technology) $2699

Business lease: $95/Mo.

- 233MHz Pentium® processor with MMX™ Technology
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- 32MB SDRAM (expandable to 144MB)
- 512KB Pipelined Burst Cache
- 3GB HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem*
- 20X Modular CD-ROM Drive
- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 95
- Corel Office Suite 8
- Carrying Case
- 24-hr./7-day Technical Support
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

Quantex H 1330 (with MMX™ Technology) $3299

Business lease: $108/Mo.

- 266MHz Pentium® processor with MMX™ Technology
- Intel Mobile Module (I.M.M.) Architecture
- 13.3" XGA Active Matrix Display
- 32MB SDRAM (expandable to 144MB)
- 512KB Pipelined Burst Cache
- 3GB HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem*
- 20X Modular CD-ROM Drive
- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 95 or Windows NT Workstation 4.0
- MS Office '97 Small Business Edition
- Carrying Case
- 24-hr./7-day Technical Support
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

H 1330 w/233MHz Pentium® processor w/MMX™ Technology.....$3149

Quantex H 1331 (with MMX™ Technology) $3799

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- 266MHz Pentium® processor with MMX™ Technology
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- 13.3" XGA Active Matrix Display
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- 512KB Pipelined Burst Cache
- 4GB HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem*
- 20X Modular CD-ROM Drive
- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- 2nd Lithium Ion Battery
- Mini-Docking Station
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 95 or Windows NT Workstation 4.0
- MS Office '97 Small Business Edition
- Carrying Case
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- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

* Maximum transmission speed of up to 56Kbps when downloading and 33.6Kbps when uploading data. Actual speeds may vary depending on line conditions and current FCC restrictions.

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- 24X Max EIDE CD-RDM Drive
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- Altec-Lansing ACS-90 Speakers
- Duantex Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows '95 with MS Plus!
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- 3-year limited warranty with 1-year On-Site Service**

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QP5/233 M-2 *(with MMX™ Technology)* $1499
Lease: $53/Mo.

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- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel Video Phone Ready
- STB Nitro 3D w/4MB SGRAM
- 17" Digital Monitor (16" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-RDM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Duantex Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows '95 with MS Plus!
- Value Multimedia Software Bundle
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QP5/200 M-2 (with MMX™ Technology). . $1449
QP6/233 M-2x (with Pentium II processor). . $1699

QP6/266 M-3x *(featuring Pentium® II processor)* $1949
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- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel Video Phone Ready
- 64-bit 3D AGP Graphics Card with 4MB SGRAM
- 17" Digital Monitor (16" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- ATX Case
- 104-Key Keyboard with MS Mouse
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- Value Multimedia Software Bundle
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- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel Video Phone Ready
- 3D Labs Permedia 2 AGP Graphics Card with 8MB
- 19" Digital Monitor (18.1" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-RDM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers with ACS-250 subwoofer
- ATX Case
- 104-Key Keyboard with MS Mouse
- MS Windows '95 with MS Plus!
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

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QP6/266 M-4X (with Pentium II processor). . $2249

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- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- STB Nitro 3D w/4MB SGRAM
- 15" Digital Monitor (14" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-RDM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Duantex Tower Case
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QP6/233 SM-2x *(featuring Pentium® II processor)* $1799
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- 233MHz Pentium® II Processor
- 32MB SDRAM Memory / 512KB Secondary Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 128-bit Riva 128 3D AGP Graphics Card with 4MB SGRAM
- 17" Digital Monitor (16" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-RDM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- ATX Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows '95 with MS Plus!
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- 3-year limited warranty with 1-year Dn-Site Service**

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QP6/300 SM-2x (with Pentium II processor). $2049

QP6/266 SM-3x *(featuring Pentium® II processor)* $2049
Lease: $72/Mo.

- 266MHz Pentium® II Processor
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 128-bit Riva 128 3D AGP Graphics Card with 4MB SGRAM
- 17" Digital Monitor (16" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-RDM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- ATX Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows '95 with MS Plus!
- Power Multimedia Software Bundle
- Microsoft Dffice '97 Small Business Edition
- 3-year limited warranty with 1-year Dn-Site Service**

QP6/233 SM-3x (with Pentium II processor). $1949
QP6/300 SM-3x (with Pentium II processor). $2199

QP6/300 SM-4x *(featuring Pentium® II processor)* $2549
Lease: $89Ma.

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- 19" Digital Monitor (18.1" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- Toshiba 2nd-Generation DVD-RDM Drive w/Decoder Board
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- ATX Case
- 104-Key Keyboard with MS IntelliMouse
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Snap Judgments

Real-world users put 10 digital cameras to the test.

First, let's talk sex appeal.

Scanners don't have it. They're big, bone-colored boxes. Color printers don't have it, either. Like scanners, they're chunky, square, workaday machines.

But digital cameras, the (relatively) new kids on the graphics block? They've got sex appeal to spare. If nothing else, digital cameras represent an exciting new way of doing something that many of us have been doing for years: taking pictures. ▶

CANON POWERSHOT 350 Good image quality and a decent price make it one tester's pick.

KODAK DC120 The Kodak is bulky, but it tops the chart in image quality—and wins one tester's highest praise.

PHOTOGRAPH: JOHN GREENLEIGH

BY JAMES A. MARTIN

Best Buy

SONY'S $799 DIGITAL MAVICA MVC-FD7 is *PC World's* Best Buy for several reasons. First, it simplifies two common problems with digital cameras—image storage and file transfers—by using standard, and inexpensive, 3.5-inch floppy disks as its storage media. Take a picture, store it on a floppy, pop the disk into your PC, and you're done. The Sony's above-average images, bright LCD panel, intuitive array of controls, built-in image enhancement filters, and decent battery life also earned raves.

So we know that digital cameras are cool, but are they practical? Are they easy to operate, or do you have to be a Pascal programmer to use one? Have they evolved enough to produce images that rival 35-millimeter film photos?

To find out, we put ten digital cameras with prices ranging from $299 to $799 through a variety of tests. For starters, we asked three people—each of whom represents a different kind of user that digital camera makers are hoping to woo—to help us evaluate the various models. Michael Demers, MIS and office manager for The Grubb Company in Oakland, California, gave us a real estate agency perspective. Demers tested the five cameras that are best for someone who needs high-quality images for printed output. Paul Heltzel, a PC World Online staff editor and freelance Web-site developer in San Francisco, got acquainted with the five cameras targeting Web designers, among others. And Kim Grimes, a photography hobbyist and home PC user in Boston, spent a week using the five cameras most likely to appeal to home users.

Finally, *PC World* hired a professional photographer, Marc Simon, to take pictures with each of the ten cameras and with a 35mm film camera so that we could compare their image quality (see "Top Digital Images: Kodak Closest to 35mm"). We also tried out the cameras ourselves to evaluate that all-important hands-on feel. And the PC World Test Center put the cameras through their paces to see how long their batteries would last (see the sidebar, "Take Your Last Shot").

PHOTOGRAPHS: JOHN GREENLEIGH

DIGITAL CAMERAS FEATURES COMPARISON

MODELS	SCORECARD: Price (12/1/97)/ pricing score	Image quality	Features	Ease of use	Battery life	FEATURES: Weight (ounces)[1]	Resolution (maximum/ minimum)	Image capacity at high quality/ low quality
Canon PowerShot 350 800/848-4123 www.powershot.com	$499 street/average	good	average	average	average	10.2	640 x 480/ same	11/47
Casio QV-200 800/962-2746 www.casio.com	$499 street/average	average	good	average	average	6.8	640 x 480/ 320 x 240	64/192
Fujifilm DS-7 800/378-3854 www.fujifilm.com	$549 street/average	poor	good	good	poor	8.5	640 x 480/ 320 x 240	30/60
Hewlett-Packard PhotoSmart Digital Camera 888/474-3867 www.hp.com/go/photosmart	$299 list/inexpensive	poor	average	excellent	excellent	12	640 x 480/ same	4/32
Kodak Digital Science DC120 888/375-6325 www.kodak.com	$799 street/expensive	excellent	good	poor	good	18.4	1280 x 960/ same	2/20
Minolta Dimâge V 800/506-3296 www.minoltausa.com	$695 list/expensive	good	good	good	poor	8.8	640 x 480/ 320 x 240	16/40
Nikon Coolpix 300 Personal Imaging Assistant 800/526-4566 www.nikonusa.com	$699 street/expensive	average	excellent	poor	average	8.6	640 x 480/ same	66/132
Ricoh RDC-2 800/225-1899 www.ricohcpg.com	$799 list/expensive	good	good	average	good	11	768 x 576/ same	9/38
Sony Digital Mavica MVC-FD7 800/352-7669 www.sony.com/mavica	$799 list/expensive	excellent	excellent	excellent	good	20.8	640 x 480/ same	20/40
Vivitar ViviCam 3000 800/682-6677 www.vivitar.com	$499.95 list/average	poor	poor	good	excellent	8	1000 x 800/ 500 x 400	10/20

Best Buy

[1]Without batteries or peripherals.

INSTA-PHOTOS

IN THE END, we found that digital cameras are almost as intuitive to use as point-and-shoot film cameras. But ease of use isn't only about intuitive controls: In many cases, digital cameras make life easier for those who need images immediately. Sony's Digital Mavica MVC-FD7, for example, receives our kudos for storing images directly on standard 3.5-inch floppy disks. Nearly all other models here require you to connect PC and camera with a serial port cable. Several, including the Ricoh RDC-2, let you store and transfer images on PC Cards, and a few (like Fujifilm's DS-7) offer video output for connecting the camera to a TV.

MINOLTA DIMÂGE V

Mobile photography: The Dimâge's lens links by cable.

No single unit earned high marks in all areas. But taking picture quality, battery life, ease of use, and price into account, *PC World* editors picked the $799 Sony Digital Mavica as Best Buy. We liked the camera's convenient storage, ease of use, and features. Olympus and Epson earned Best Buys last year, but the companies' latest models weren't available in time for this review. (See "News Flash.")

As for image quality, *PC World* and its three testers didn't always agree on which camera produced the best pictures. But they did agree that even the best digital images don't measure up to film photos. In fact, Demers was the only tester who would opt for a digital camera. Why? His pick, the Kodak Digital Science DC120, offers instant images good enough for real estate brochures.

CASIO QV-200

Want a new angle? The lens on the QV-200 rotates for different perspectives.

Says Heltzel, "When there's a digital camera for $500 or less with pictures as good as, or nearly as good as, what you'd get with film, then I'll buy one. Until then, I'll stick with the one-hour film lab and my scanner." ▶

Storage media	Output method(s)	35mm-equivalent lens size (mm)	Aperture setting(s)	Shutter speed range (seconds)	Closest focus range (inches)	Viewfinder	COMMENTS Testers' feedback	Reader service number
2MB CompactFlash memory card	serial port, video	42	f/2.8	1/4-1/2000	1.2	LCD	Kim Grimes, photo hobbyist: "My favorite."	741
4MB internal flash memory	serial port, video	38	f/2, f/8	1/8-1/4000	3.5	LCD	James A. Martin, editor: "Large storage capacity and software bundle are the only distinguishing features."	742
2MB SmartMedia card	serial port, video	38	f/2.2, f/8	1/4-1/5000	3.5	LCD	Marc Simon, photographer: "Easy camera adjustments."	743
2MB Photo Memory card	serial port	43	f/2.8-f/11	1/30-1/2000	2.8	optical	Grimes: "Easy to use, but poor photo quality."	744
2MB internal flash memory	serial port	38-114 zoom	f/2.5-f/24	16-1/500	7.9	LCD, optical	Michael Demers, real estate office manager: "My favorite."	745
2MB SmartMedia card	serial port	34-92 zoom	f/5-f/5.6	1/30-1/10,000	2.4	LCD	Paul Heltzel, Web developer and editor: "Fun camera that's easy to use."	746
4MB internal flash memory	serial port, video, optional SCSI $150	45	f/4, f/6.2	1/30-1/2500	5.5	LCD, optical	Heltzel: "Too difficult to maneuver through screens."	747
2MB internal flash memory	serial port, video, PC Card	35 or 55	f/3.7, f/5.6	1/8-1/1000	0.4	optical, optional LCD $249.95	Demers: "Great design, but the extra cost of the LCD makes it impractical."	748
1.44MB floppy disk	floppy disk	40-400 zoom	f/1.8-f/2.9	1/60-1/4000	1	LCD	Heltzel: "My favorite."	749
400KB internal flash memory	serial port, PC Card	17	f/4	1-1/2000	4.8	optical	Simon: "Viewfinder is inaccurate."	750

For information on camera dimensions, optimal storage, support, and bundled software, visit www.pcworld.com/feb98/cameras.

All products: 910

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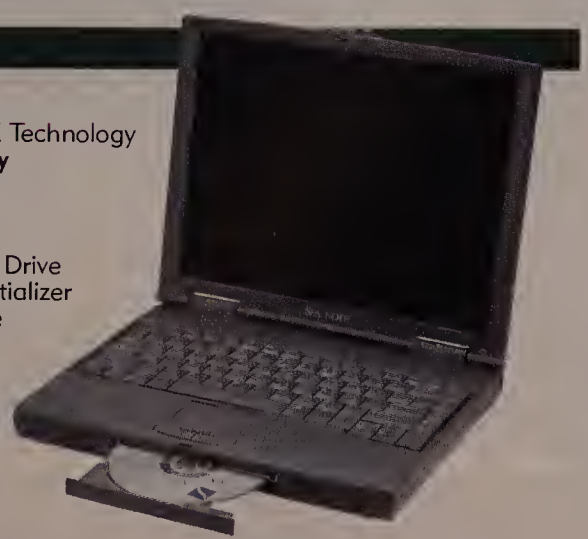

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Michael Demers REAL ESTATE AGENCY OFFICE MANAGER

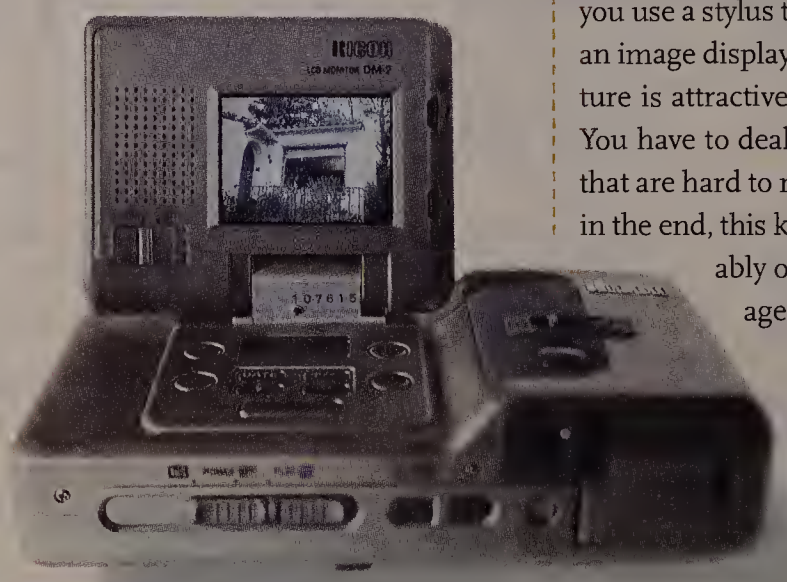
DIGITAL CAMERAS are often marketed as an ideal way for real estate agencies to photograph properties for their fliers and brochures. As the MIS and office manager for a realty company in Oakland, California, I found digital cameras intriguing, but was doubtful they would live up to all the marketing hype.

For our purposes, a digital camera must be as easy to use as a point-and-shoot film camera. Many of our agents take pictures when they visit a property, but some of them may be nervous about using something "digital." Also, a digital camera's images have to look good when printed. If the pictures in our fliers look blurry or colorless, they're not going to help us make a sale.

I took outdoor and indoor shots of a home on the market using five digital camera models, most of which promise the high resolution required for good-quality printed images: the Fujifilm DS-7, the Kodak Digital Science DC120, the Nikon Coolpix 300 Personal Imaging Assistant, the Ricoh RDC-2, and the Vivitar ViviCam 3000. I found them all more or less easy to use. As for photo quality, a few of the cameras took better-looking pictures than others, but almost all the photos I got were decent. Still, two favorites emerged: the Kodak DC120, followed closely by the Ricoh RDC-2.

TAKING PICTURES

THREE OF THE cameras I tested—the Ricoh RDC-2, Nikon Coolpix, and Kodak DC120—let you set up a shot by looking either through a traditional optical viewfinder or at an LCD panel. For me, having both is critical. Frequently, I needed the optical viewfinder to frame a picture because the LCD would wash out in bright sunlight. But I also wanted to preview the images on the LCD.



RICOH RDC-2 The detachable LCD panel on the Ricoh is crisp, but it's also a pricey $250 option.

If money were no object, the Ricoh RDC-2 would be the winner in this category. Its LCD is clear and bright with good color—and it's detachable. Unfortunately, it's a $249.95 option. Combined with the $799 you'd pay for the camera, that's about $1050—too much money to spend on a technology that changes so rapidly.

Since cost *is* important, I'd go with the $799 Kodak DC120. Its LCD is smaller than the Ricoh's, but its zoom lens has a wider range than any other camera I tested. [Of all the cameras reviewed, the Sony Digital Mavica had the widest range. —*Editor*] I also found the Kodak easy to hold and operate.

Of all the models I tested, the Kodak DC120 had the highest-resolution images—up to 1280 by 960 pixels. But such picture clarity comes at the cost of storage capacity: Each image file can take up several megabytes, and you can take only 2 "best"-quality (uncompressed) images, or 20 compressed images, before the camera's memory is full.

The Nikon Coolpix 300 is an interesting camera—what the company calls a "personal imaging assistant"—that lets you use a stylus to write notes directly on an image displayed on its LCD. This feature is attractive, but it's also awkward: You have to deal with on-screen menus that are hard to read in bright light. And in the end, this kind of extra would probably only confuse most of the agents in my office.

FROM CAMERA TO COMPUTER

THE DOWNLOADING process is relatively painless with nearly all the cameras: You simply connect one end of the serial cable to the camera and the other end to the PC. Initially, I did have trouble connecting the Nikon Coolpix to my PC: The Coolpix was in SCSI connection mode, and I was trying to make a serial port connection. To switch modes, I had to use the stylus and navigate through several menus on the LCD—a cumbersome process. ▶

PHOTOGRAPHS: (TOP) ANDY FREEBERG; (BOTTOM) JOHN GREENLEIGH

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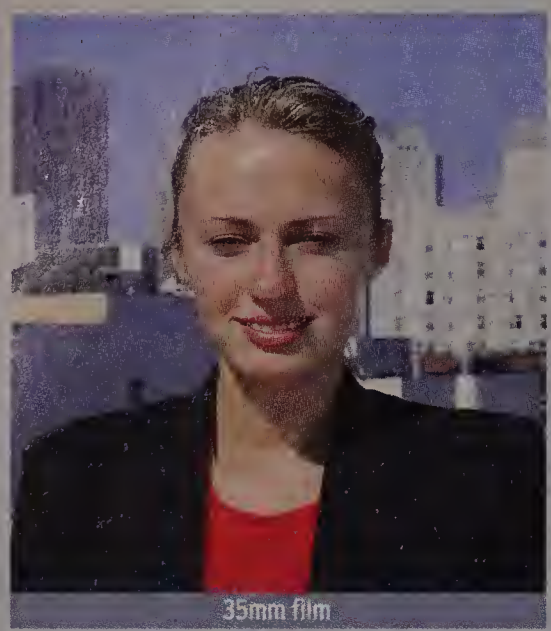
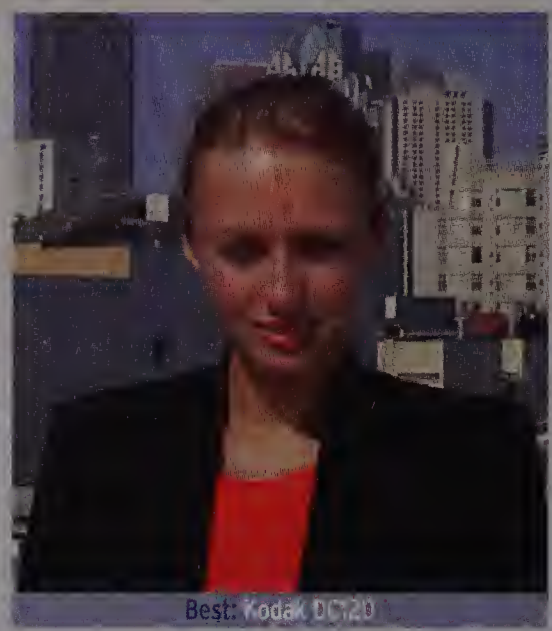

35mm film


Best: Kodak DC120

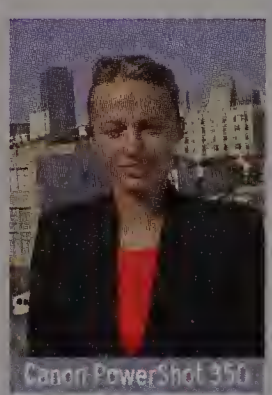
Top Digital Images

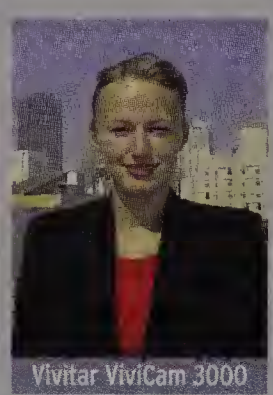
Kodak Closest to 35mm

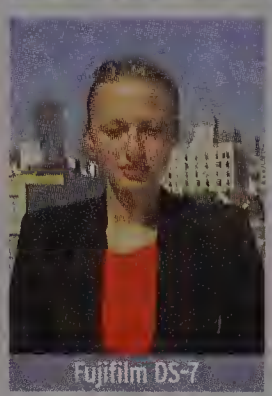
ARE DIGITAL IMAGES as good as film photos? In the case of the **Kodak Digital Science DC120** camera, the answer is: almost. The DC120's 1280-by-960-pixel resolution is higher than that of any other camera we tested. The result? The Kodak creates images that look almost as good as 35mm film photos—until we enlarged the digital pictures so we could see the pixels. Overall, though, the *PC World* judges found that Kodak's images were the sharpest and cleanest, with accurate (if slightly dark) color.

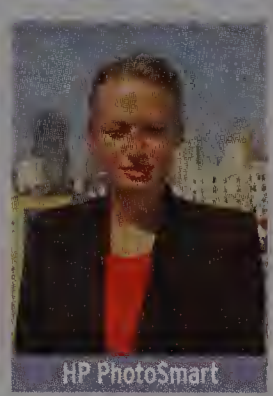
Our second choice: the **Sony Digital Mavica MVC-FD7.** Though it only has 640 by 480 resolution, the Sony captured images with rich, accurate color and good image detail.

Among the worst? The **Casio QV-200.** Its Images were so washed out that we thought our camera was malfunctioning and retested with another unit. To no avail: Both produced equally bad images.


Canon PowerShot 350


Vivitar ViviCam 3000


Fujifilm DS-7


HP PhotoSmart

Worst: Casio QV-200

Minolta Dimage V

Nikon Coolpix 300

Ricoh RDC-2

Sony Digital Mavica

IMAGE EDITING TOOLS

PICTUREWORKS' PhotoEnhancer, which comes with the Kodak DC120, and PhotoStudio, Ricoh's own image editor, are the best photo editing programs I tested. They both are easy to use and offer a number of useful image enhancement tools and special effects filters.

PICTURE QUALITY

THE RICOH RDC-2 and Kodak DC120 are practically in a photo finish in this race. In my opinion, the colors in the RDC-2 images were the most accurate, the most vivid, and the best looking. But its photos were somewhat fuzzy in the background. Still, I would feel comfortable using the Ricoh pictures in a flier, even without tweaking them first.

But when it comes to picture detail, no digital camera I tested matched the Kodak DC120. Before I'd use its pictures in a flier, though, I'd want to lighten them a little.

To my eye, the rest of the cameras took decent pictures, but all their images were noticeably dark in print, and some—especially those from the Fujifilm DS-7—were blurry as well.

MY PICK

INITIALLY, MY FAVORITE was the Ricoh RDC-2. But its best feature—the detachable LCD panel—is also its downfall because of the high additional cost. That leads me to the Kodak DC120. Its hipness quotient doesn't compare to the RDC-2's, but with its zoom lens, detailed images, and well-designed software, the DC120 is a solid choice for anyone who needs high-quality digital images.

The real question, though, is whether I would buy a digital camera over a film-based model for our agency. The answer, without hesitation, is yes. As I mentioned, our agents are not crack photographers. Not only are these cameras easy to use, but they also let you preview pictures on the spot to make sure you've got something usable. That certainly beats sending off a roll of film to the developer, discovering that none of the pictures are any good, and then having to go back to the site and take more pictures. ▶

PHOTOGRAPHS: MARC SIMON

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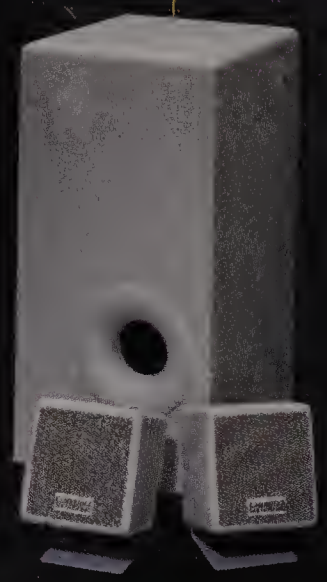

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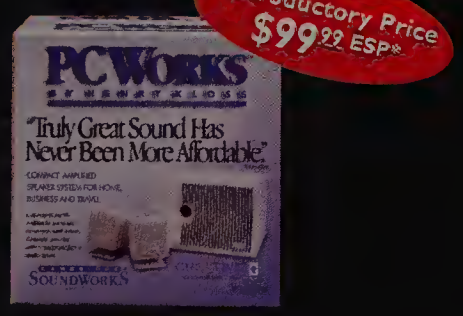

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Paul Heltzel WEB DEVELOPER AND EDITOR

AS A FREELANCE Web-site developer, I often need to get a photograph online within hours. So digital cameras have a lot of appeal to someone like me. But a high-quality Web site requires professional-looking photographs, so a digital camera is going to be worth the money only if it can deliver quality as well as speed.

To find out, I worked with five digital cameras: the Canon PowerShot 350, the Fujifilm DS-7, the Minolta Dimâge V, the Nikon Coolpix 300, and the Sony Digital Mavica. From my perspective, the best bet is the Digital Mavica, though I found a lot to like in the Dimâge V, as well.

TAKING PICTURES

THE MINOLTA Dimâge V was my favorite for shooting photos. It's as easy to use as a standard film camera, it's light and compact, and it also has a rotating lens that can be detached.

But the Sony Digital Mavica has at least as much to recommend it. As with the Dimâge, its buttons are sensibly laid out. With its built-in image enhancement filters, you can give pictures a specific look, such as sepia tone or pastel: Just select an effect, take the picture, and instantly view the results on the LCD. And the Digital Mavica has one of the largest and best LCD panels, though like all such displays, it can be hard to read outdoors.

My least-favorite camera for taking pictures was the Nikon Coolpix 300. Its unusual design requires you to use a stylus to change basic settings.

FROM CAMERA TO COMPUTER

THE DIGITAL MAVICA makes it extremely easy to move images to your PC by storing them on a floppy disk. Also, by default it saves images in JPEG format, a standard for displaying photos on the Web. This means you can take an image off the floppy disk and drop it onto a Web page without having to download it or convert it to another file format.

The other cameras I tested connected to the PC with serial port cables. They were all relatively easy to connect, though some of them—such as the Fujifilm DS-7—require several software steps before you can transfer your pictures.

IMAGE EDITING TOOLS

THE TOOL I NEED most is an efficient TWAIN driver that lets me easily bring images right into Photoshop. Minolta's TWAIN driver, Camera Access, was the most solid. It includes a simple set of image editing tools, and the interface is straightforward and practical. Sony's driver was just as efficient at moving images into Photoshop, though the driver itself doesn't offer any editing tools. ▶

PHOTOGRAPH: ANDY FREEBERG

Take Your Last Shot

IN OUR BATTERY-LIFE TESTS, the Hewlett-Packard PhotoSmart had the most impressive results. The catch? The PhotoSmart doesn't have an LCD panel, those handy screens that suck up battery life. At the other end of the spectrum, the Minolta Dimâge V survived for a meager 44 minutes before we had to stop clicking. Our Best Buy, the Sony Digital Mavica, had decent battery life at a little less than 2.5 hours.

BATTERY-LIFE TEST RESULTS

DIGITAL CAMERAS	Battery type	Battery life (hours:minutes)
HP PhotoSmart	4 AA alkaline	7:24
Vivitar ViviCam 3000	6 AA alkaline	6:15
Ricoh RDC-2	4 AA alkaline	4:26
Kodak DC120	4 AA alkaline	3:33
Sony Digital Mavica MVC-FD7	1 rechargeable lithium ion	2:23
Nikon Coolpix 300	4 AA alkaline	1:58
Casio QV-200	4 AA alkaline	1:36
Canon PowerShot 350	3 rechargeable nickel cadmium	1:04
Fujifilm DS-7	4 rechargeable nickel cadmium	0:46
Minolta Dimâge V	4 AA alkaline	0:44

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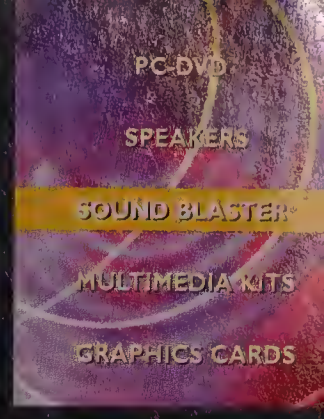

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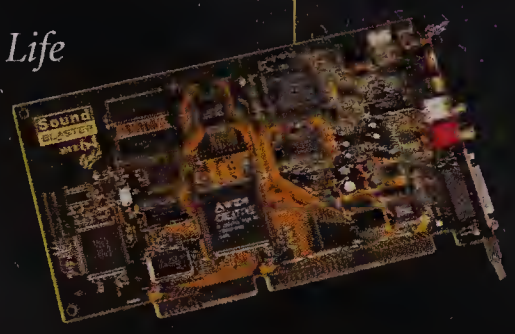

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January 6, 1998
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- 32X Max^^ Variable CD-ROM Drive
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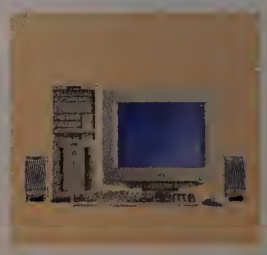

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WITH MMX TECHNOLOGY

Common features listed above plus:

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- 512KB L2 Pipeline Burst Cache
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- MS Windows 95/Internet Explorer
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WITH MMX TECHNOLOGY

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- 32MB SDRAM Memory
- 256KB L2 Pipeline Burst Cache
- 2.1GB ATA Hard Drive
- 128-bit Graphics Accelerator with 16 Million Colors at 800x600
- MS Office 97 Small Business Edition
- MS Windows 95/Internet Explorer
- 6.4 Pounds*/Touchpad

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PICTURE QUALITY

The Minolta Dimâge V and the Sony Digital Mavica produced the best images. The Dimâge's images looked about the same on the LCD as they did on a PC screen. Its photos also had the most accurate color, though they were a little fuzzy. The Sony Digital Mavica's images were less pixelated than images from any other camera I tested, but their colors weren't quite as true as those from the Dimâge. The bottom line: It would be easier to jazz up the color in the Sony Digital Mavica photos than to sharpen the Minolta Dimâge images.

MY PICK

I'D RECOMMEND the Sony Digital Mavica for Web publishers. Storing your images on a floppy makes getting them onto the Web easy and fast. And the picture quality is among the best I saw. All told, the Digital Mavica is a solid camera.

But all of that aside, I'd still choose a film camera over one of these digital models, even for creating Web content. The time saved isn't all that much, and the images simply can't compare with what you get from film.

Kim Grimes PHOTO HOBBYIST

PHOTOGRAPHY IS a passion of mine, but from what I'd heard, digital camera images usually look like they came from a computer, not from a camera. That gave me cause for concern. Even though photography is just a pastime and not my profession, it's important to me that my photos look good when printed.

Still, I was eager to see for myself. I tested five digital cameras aimed at home users (as well as others): the Canon PowerShot 350, the Casio QV-200, Hewlett-Packard's PhotoSmart Digital Camera, the Minolta Dimâge V, and the Sony Digital Mavica.

My goal in using these cameras was to create a pictorial calendar that I could send to friends and family. For my tests I took indoor shots at a cathedral, as well as two outdoor scenes. Then I printed the pictures on an Epson Stylus Photo color ink jet printer.

Because of its image quality, the PowerShot 350 was my favorite camera, though I also liked a number of things about the Digital Mavica.

TAKING PICTURES

THE CAMERAS WERE about as easy to operate as a point-and-shoot film camera—a pleasant surprise.

I had an unpleasant surprise, too: LCD viewfinders. LCDs often get washed out in bright daylight, which makes it difficult to see what you're shooting. Each of the cameras I evaluated (except the HP PhotoSmart) uses an LCD panel as its sole viewfinder. The PhotoSmart has only a traditional optical viewfinder, the kind you'd get with a 35mm film camera. [A few of the cameras reviewed in this article, such as the Kodak DC120, offer both LCD and optical viewfinders. —*Editor*] On the other hand, an LCD screen lets you preview a picture on the spot—you can look at images and delete the bad ones immediately.

The Sony Digital Mavica has the largest LCD, so it gave me a better ▶

VIVITAR VIVICAM 3000 The ViviCam is as easy to use as a standard film camera, but its image quality is among the worst we saw.

FUJIFILM DS-7 Though the Fujifilm has good features, images were too blurry for our tastes.

HP PHOTOSMART Without an LCD panel, the PhotoSmart outlasted the other cameras in our battery tests.

PHOTOGRAPHS: (TOP) BILL O'CONNELL; (BOTTOM) JOHN GREENLEIGH

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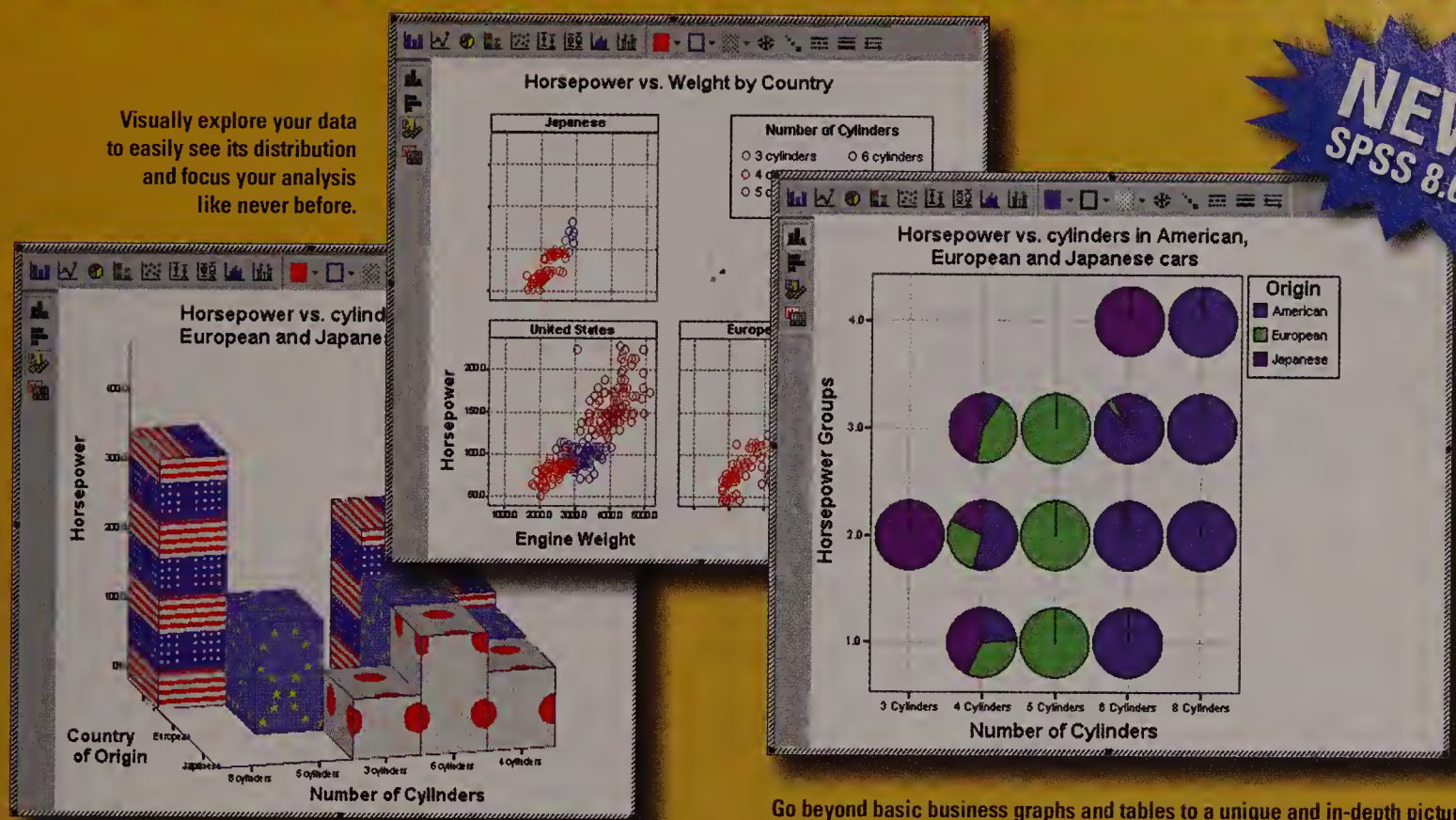

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News Flash

✳ **Agfa** is rounding out its digital camera line with two new models: the $499 **EPhoto 780** and the $899 **EPhoto 1280.** The 780 has become Agfa's midrange camera, with a top resolution of 1024 by 768 pixels, a 1.8-inch LCD, and a 2MB SmartMedia memory card. The 1280 supports up to 1280 by 960 resolution and includes a 2-inch LCD panel and a 38-114mm 35mm-equivalent zoom lens. Agfa Division, Bayer Corp.; 888/281-2302; www.agfahome.com

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AGFA EPHOTO 1280

✳ **Epson's** $799 **PhotoPC 600** continues the trend of bringing high resolution (1024 by 768 pixels) to mid-price digital cameras. Meanwhile, the new $299 **PhotoPC 550,** with point-and-shoot-style controls, is targeted at beginning users. Epson America; 800/463-7766; www.epson.com

✳ **Olympus** has updated its digital camera line with the new **D-220L** and **D-320L.** Both models offer video output for viewing images on a TV. The $499 D-220L captures up to 640 by 480 pixels; the $699 D-320L goes up to 1024 by 768 pixels. Olympus America; 800/347-4027; www.olympus.com

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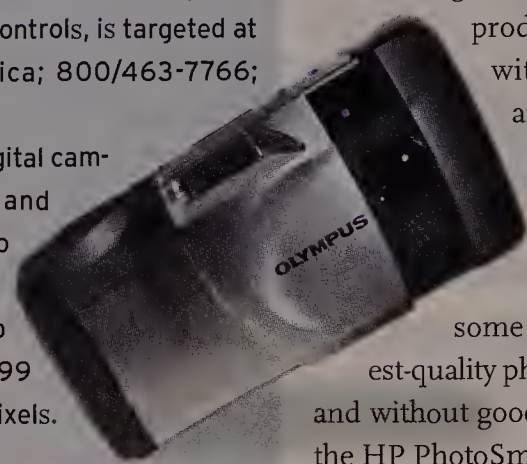


OLYMPUS D-320L

As we went to press, a crop of new digital cameras was on the horizon; here's a snapshot of a few. For information on other cameras, visit PC World Online at www.pcworld.com/feb98/cameras.

view of my subject and made me more confident of my shots. The Digital Mavica's LCD had another nice feature: It displayed the amount of remaining battery power—a reassuring touch.

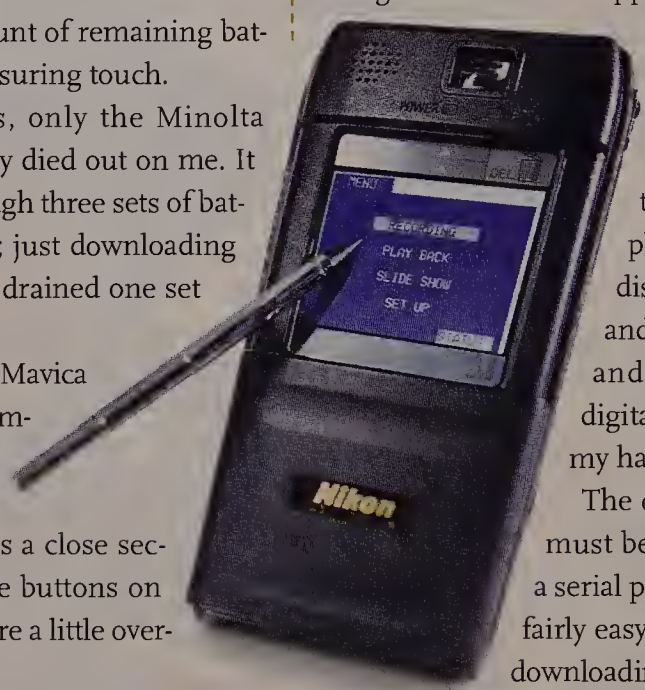
As for batteries, only the Minolta Dimâge V regularly died out on me. It actually went through three sets of batteries in one week; just downloading pictures to my PC drained one set of fresh batteries.

The Sony Digital Mavica was my favorite camera for taking pictures. The Canon PowerShot 350 was a close second, though all the buttons on its camera back were a little overwhelming at first.

FROM CAMERA TO COMPUTER

BECAUSE IT STORES pictures directly onto standard 3.5-inch floppy disks, the Sony unit made the process of downloading images to the computer as easy as it gets. When one floppy disk became full, I'd just pop in another. And to transfer pictures, I simply inserted the disk into the PC, and then dragged and dropped the digital images onto my hard drive.

The other cameras must be connected to a serial port, which was fairly easy to do, but the downloading process can quickly consume batteries. After my experience with the Minolta Dimâge V, I would hook up an AC adapter to the camera to make the batteries last longer.



NIKON COOLPIX 300

The Coolpix may be cool looking, but everyone who tested it found it cumbersome to use.

IMAGE EDITING TOOLS

ADOBE PHOTODELUXE, which comes with the Canon, Minolta, and Casio cameras (among others), has something for everyone. It lets you do basics, like cropping and rotating, and also provides image enhancement tools, such as a filter that gives photos a watercolor look.

PICTURE QUALITY

NONE OF THE CAMERAS delivered image quality comparable to that of 35mm film. A few came reasonably close, however.

On average, the Canon PowerShot 350 produced the best images, with rich, accurate color and relatively good resolution. The Sony Digital Mavica's pictures were a close second, with good detail but some faded color. The poorest-quality photos—blurry, colorless, and without good contrast—came from the HP PhotoSmart.

MY PICK

IF I WERE TO BUY A digital camera, it would be the Canon PowerShot 350. It offers the best picture quality—and for me, that's the most important feature. In addition, the $499 street price is reasonable, as digital cameras go.

My second choice would be the Sony Digital Mavica. I appreciated its ability to store images on a floppy disk, and its LCD was above average. But its pictures just weren't as good, to my eye, as the Canon PowerShot's.

In all honesty, though, if I were shopping for a new camera I'd still opt for one that uses film. The prices are much lower than what you'd pay for a digital camera and the picture quality of old-fashioned film still can't be beat.

online *Find related information at www.pcworld.com/feb98/cameras. James A. Martin is a contributing editor for* PC World. *Battery-life testing by freelance tester Ann Cassidy and* PC World *Performance Analyst Mike Salayko. See page 14 for contact information.* ■

PHOTOGRAPHS: JOHN GREENLEIGH

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Look no further. With 17 industry awards in 1997, the Micron™ TransPort® has made a name for itself as a true desktop performing portable PC. The TransPort XKE has been called "the all-around fastest notebook you can buy"* and for good reason. It boasts a 200MHz or 233MHz Pentium® processor with MMX™ technology and up to 192MB EDO RAM for an incredible, powerful performance. And because it's portable, you can depend on this dynamo everywhere your work or play may take you.

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*Computer Shopper, Sept. 1997

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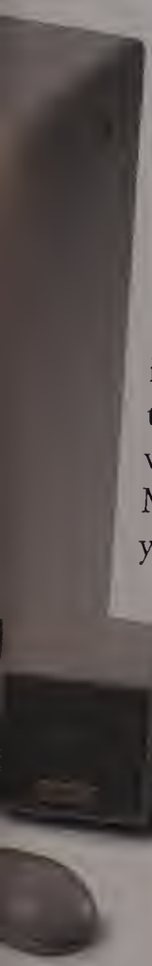
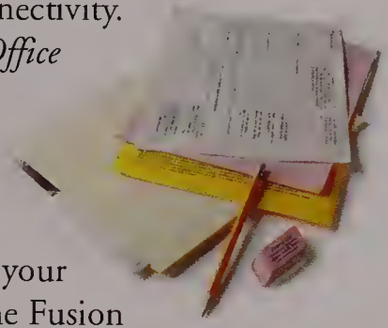
Work hard, play hard. Get the job done faster and have more fun with help from the Micron™ Millennia® family. Earning more than 55 awards and recommendations in 1997 alone, the Millennia desktop offers unbeatable performance, power and multimedia applications for your entire family!

A force to be reckoned with. The incomparable Millennia XKU is "a standout performer," according to *PC Magazine* editors. And we like standing out. Our award-winning Millennia XKU features the latest in the Intel Pentium® II processor and chip set technology, along with an accelerated graphics port. That means more memory and power for your most demanding applications.

Nothing run-of-the mill here. Our flexible Millennia MME — the first desktop to incorporate both MMX™ technology and SDRAM — delivers better multimedia results than ever, and the USB features give you high-speed connectivity.



We caught the attention of the editors at *Home Office Computing*, who said the Millennia MME "costs less than you might think and runs circles around most other MMX-based systems."



You'll like the fringe benefits. We custom build your new Millennia system to your exact needs. Add the Fusion 3D™ option for awesome DVD technology, a super sound card, incredible graphics and more. Get multimedia sights and sounds that blow the whole family away! And remember, all Millennia models come standard with a 100MB Zip drive for virtually unlimited storage. When you buy certain Millennia systems, you'll get a software bundle of your choice for everyone in your home, and it's included with your purchase. Millennia systems start at $1,599, so you won't compromise power or price. Call Micron today — we'll make make you feel right at home!

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Enterprising thoughts. If you're ready to network, we've got end-to-end solutions built from the ground up. Hardware. Software. And on-site technical support, if you need it. Our award-winning Micron NetFRAME servers can handle any job, big or small. We work with you to determine exactly what you need — and then we build it just for you. Micron NetFRAME servers cover all your priorities, like scalability, security, and easy maintenance. Start by looking at our entry-level LV2000 server — and get flexibility at a competitive price. Take it one step further with our Micron MV5000 for enterprise features at a mid-range price. We can even preinstall Oracle database software to get your network up and running. Or call about our incomparable enterprise solutions. And get wired for real business.

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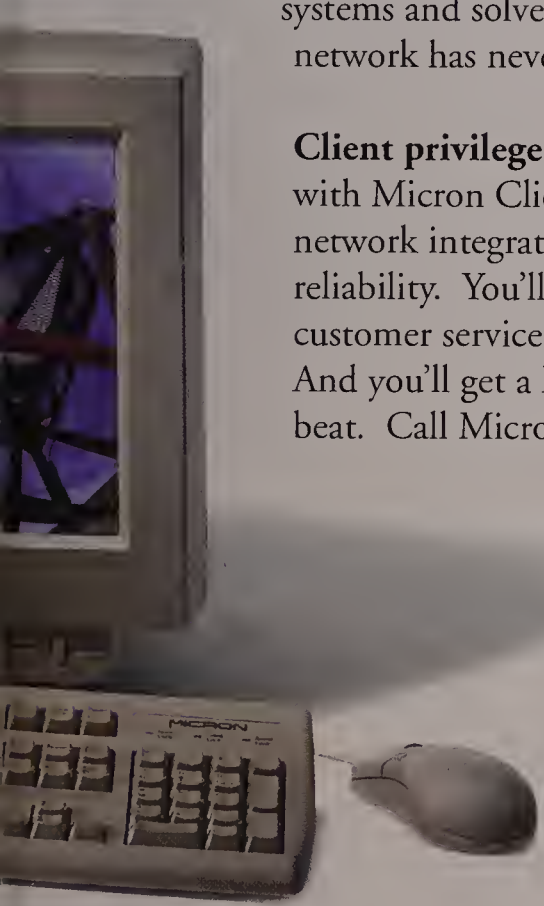

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Performance Desktop Solutions

Millennia® MME

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512KB pipeline burst cache, flash BIOS
Integrated 100MB Iomega Zip drive, 3.5" floppy drive
24X EIDE variable speed CD-ROM drive
32 voice wavetable stereo sound with speakers
3Com/US Robotics 56K x2 telephony modem*
PCI 64-bit 3D video, MPEG, 4MB EDO DRAM
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Microsoft Windows® 95 and MS® Plus!
Microsoft Office 97 Small Business Edition
Choice of one Micron Software Solutions Pak
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Millennia MME 166

Intel 166MHz Pentium® processor with MMX™ technology
32MB SDRAM
3.2GB Ultra ATA hard drive
15" Micron 500FGx, .28dp (13.7" display)

$1,599
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Millennia MME 200

Intel 200MHz Pentium processor with MMX technology
64MB SDRAM
4GB Ultra ATA hard drive
17" Micron 700FGx, .26dp (16" display)

$1,999
Bus. Lease $70/mo.

Millennia MME 233

Intel 233MHz Pentium processor with MMX technology
64MB SDRAM
6.4GB Ultra ATA hard drive
17" Micron 700FGx, .26dp (16" display)

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Millennia XKU

STANDARD FEATURES
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512KB internal L2 cache, 2MB BIOS
Integrated 100MB Iomega Zip drive, 3.5" floppy drive
32X EIDE variable speed CD-ROM drive
32 voice wavetable stereo sound, Advent 009 speakers with subwoofer
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Microsoft IntelliMouse, USB connections
Microsoft Windows 95 and MS Plus!
Microsoft Office 97 Small Business Edition
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Intel 266MHz Pentium II processor (features MMX technology)
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$2,499
Bus. Lease $87/mo.

Millennia XKU 300

Intel 300MHz Pentium II processor (features MMX technology)
64MB SDRAM
6.4GB Ultra ATA hard drive
17" Micron 700FGx, .26dp (16" display)

$2,699
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DVD-ROM, ** DVD software
E4 Cool DVD PCI decoder card: 6 channel AC-3 to 2 channel out capability, SPDIF output (digital audio out), AWE 64 ISA sound card
Cambridge SoundWorks/MicroWorks - 2 speaker satellite with subwoofer stereo system
Monster 3D graphics card with 4MB memory***
Fusion 3D game pak: Mech Warrior 2:Mercenaries D3D version, AH-64D Longbow, U.S. Navy Fighters '97, Command & Conquer, Formula 1 D3D version
MS Sidewinder Pro Joystick

XKU Add $449
MME Add $599

*Maximum transmission speed of up to 56Kbps when downloading data and 33.6Kbps when uploading. However, actual performance is dependent upon numerous factors and observed transfer rates may be less than the maximum potentials.
**The CD-ROM drive will be removed upon the purchase of the DVD upgrade
***Available only on Millennia MME system
†Available only on Millennia systems with Microsoft Windows 95

Portable Solutions

Micron TransPort™ XKE

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512KB pipeline burst cache
128-bit, 2MB DRAM graphics
20X CD-ROM drive with AutoPlay™ technology
Pick-a-Point™ dual pointing devices
16-bit stereo sound and microphone
56K fax/modem*
Dragon Systems' NaturallySpeaking Personal voice recognition software
CardBus- and Zoomed Video
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Mobile Software Solutions Pak
2 Modular expansion bays
Custom nylon carrying case
Microsoft® Windows® 95 and MS® Plus!
Microsoft Office 97 Small Business Edition
5-year/1-year Micron limited warranty

Micron TransPort VLX

Intel 166MHz Pentium processor with MMX technology
24MB EDO RAM (40MB max.)
2.1GB hard drive
16X modular CD-ROM drive
Li-Ion battery
3Com US Robotics 56Kbps modem
12.1" TFT SVGA, 800x600 display
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Zoomed video-ready
Touchpad pointing device
Microphone and 16-bit stereo sound
2-way infrared port
Modular floppy drive
Microsoft Windows 95 and MS Plus!
5-year/1-year Micron limited warranty

$2,499

Bus. Lease $85/mo.

Micron TransPort XKE 200

Intel 200MHz Pentium® processor with MMX™ technology
32MB EDO RAM
1.6GB removable hard drive
13.3" TFT XGA display

$3,799

Bus. Lease $121/mo.

Extended VLX Portable Service Options

2nd and 3rd year parts and labor; 3-business-day turnaround for 3 years[4]	$269
2nd and 3rd year parts and labor; 7-business-day turnaround for 3 years[4]	$209

Micron TransPort XKE 200

Intel 200MHz Pentium processor with MMX technology
64MB EDO RAM
3.0GB removable hard drive
13.3" TFT XGA display

$4,099

Bus. Lease $130/mo.

TransPort Options

VLX Options: Motorola Montana 33.6 fax/modem, Dragon Systems NaturallySpeaking Personal voice recognition software, 3Com PCMCIA ethernet adapter, 10-base-T, Custom nylon carrying case, Samsonite leather carrying case, 2nd Li-Ion battery, 2.1GB primary hard drive upgrade, 8MB EDO RAM upgrade (24MB total), 24MB EDO RAM upgrade (40MB total)

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Micron TransPort XKE 233

Intel 233MHz Pentium processor with MMX technology
64MB EDO RAM
5GB removable hard drive
13.3" TFT XGA display

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Business Solutions

NetFRAME® LV2000

Intel 233MHz Pentium® II processor
32MB ECC SDRAM
2GB Ultra-Wide SCSI-3 hard drive
Microsoft® Windows NT® Server 4.0 (10-user license)
NOS Support (3 incident resolutions/1st year), 7x24

STANDARD FEATURES
Single or dual Intel Pentium II processors
512KB integrated Cache in SEC package
ECC SDRAM option (4 DIMM slots)
5 expansion slots: 4 PCI, 1 ISA
Integrated Adaptec PCI Ultra Wide SCSI-3 controller
Intel EtherExpress™ Pro 100 NIC
12X SCSI-2 CD-ROM drive
10 drive bays: 4 external 5.25"/1 external 3.5"/ 2 internal 5.25"/3 internal 3.5"
Intel LANDesk® Server Manager v.2.8
Dedicated server technical support, 7x24
5-year/3-year Micron Power℠ limited warranty
1-year next-business-day on-site service*

$3,499
Bus. Lease $119/mo.

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64MB ECC SDRAM
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NOS Support (3 incident resolutions/1st year), 7x24

STANDARD FEATURES
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Memory: ECC EDO or SDRAM option
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Dual integrated Symbios Ultra-Wide SCSI-3 controllers
Intel EtherExpress™ Pro 100 NIC
Embedded RAID Upgrade option
I_20 ready via embedded Intel i960-RD
5 Internal, hot-pluggable, hard drive array bays (Upgradable to 10)
1 (one) 360 watt hot-pluggable power supply standard (Upgradable to 3 for added redundancy)
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*On-site service for NetFRAME LV2000 and MV5000 server is provided by Digital Equipment Corporation and is optional.

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512KB pipeline burst cache, DMI compliant 2MB Flash Bios
3Com 3C509 ISA Ethernet T-P NIC
16X EIDE variable speed CD-ROM drive
S3 ViRGE graphics accelerator 2MB EDO RAM
Microsoft Windows® 95
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512KB pipeline burst cache, DMI compliant 2MB Flash Bios
Network Adapter with Wake On LAN technology
16X EIDE variable speed CD-ROM drive
S3 ViRGE graphics accelerator, 2MB EDO RAM
Intel LANDesk Client Manager
Advanced Hardware Monitoring and Power Management features
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Microsoft Windows 95
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24X EIDE variable speed CD-ROM drive
Network Adapter with Wake-On-LAN Technology
PCI 64-bit 3D video, MPEG, 4MB EDO RAM
Creative Labs SoundBlaster 16 soundcard w/speakers
Microsoft Windows NT Workstation
Intel LANDesk Client Manager
Advanced Hardware Monitoring and Power Management features
Chassis Intrusion Alert
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Powerdigm XSU

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Iomega Zip IDE drive with 100MB removable cartridge	$99
Iomega 6-pack of 100MB Zip cartridges	$99
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Number Nine Revolution 8MB video card	$249

Software Options

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Corel WebMaster Suite (full retail version)	$99

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Lexmark 2030 Color Jetprinter	$179
Lexmark 7200 Color Jetprinter	$399
Lexmark Optra E+ Laser printer	$399
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Other Options

APC Per7T surge suppressor	$39
APC Pro7T surge suppressor	$59
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[1] Requires SCSI host adapter
[2] Upgrade from systems with standard Micron 17" 17FGx color monitor
[3] 1st year on-site service is available in the United States and in limited areas in Canada from third-party service provider per customer's agreement with provider
[4] 2nd year and 2nd and 3rd year offerings are available in the United States only. Extended services, if purchased after system shipment may have a higher cost.
[5] Service will be scheduled whenever possible, for the next business day after parts are received by the customer
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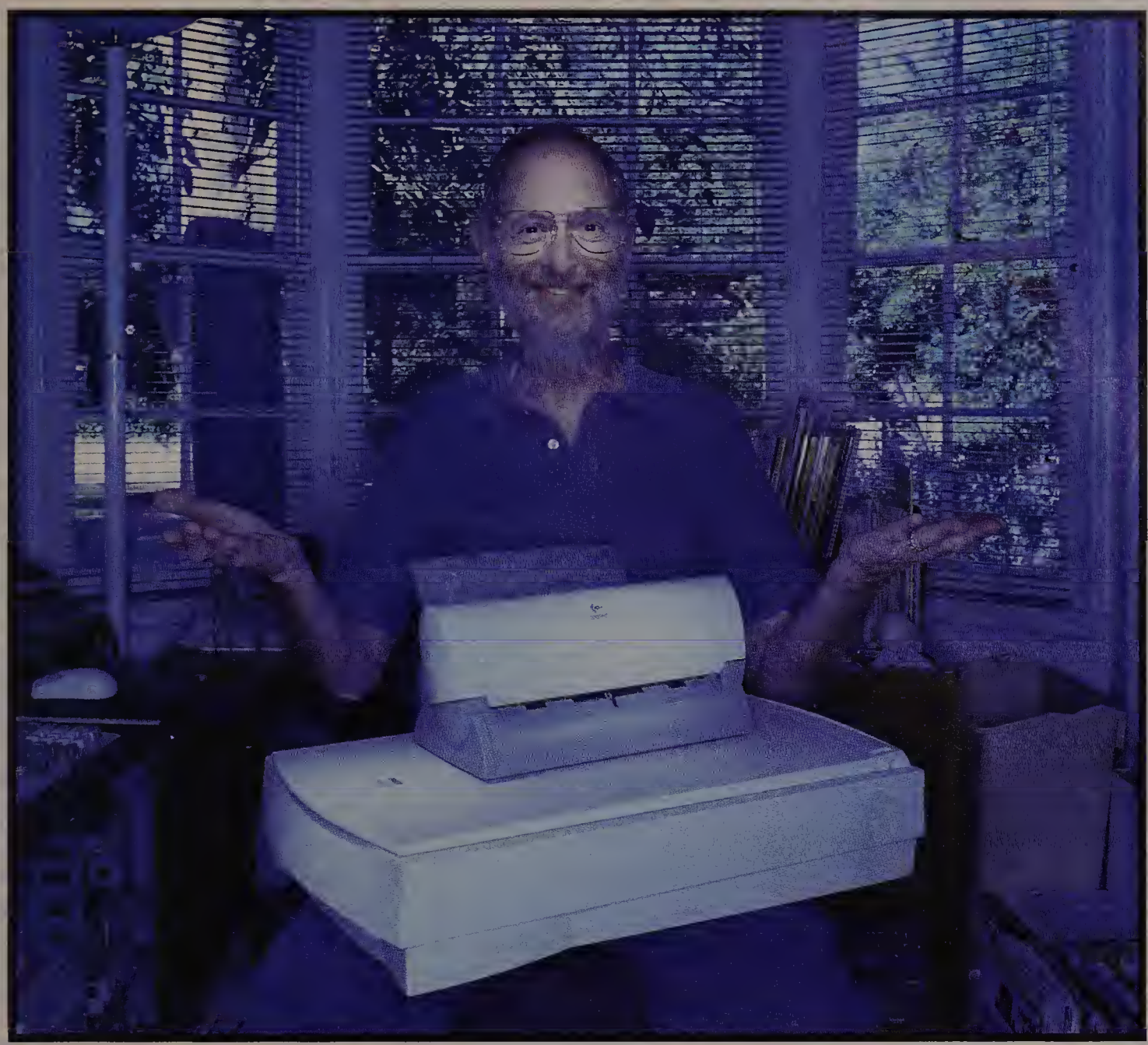
Don't own a color scanner yet? Now there's no excuse. Our own Steve Bass found you can get a great scanner for under $300.



cheap SCANS

I'D BEEN LOOKING FOR AN EXCUSE to get a scanner for months, and I finally found it: a stack of photos and printed text documents that I needed to put into my user group's newsletter. For the life of me, though, I could not decide between a flatbed or sheetfed model. Last time I'd checked, flatbeds were bulky, hard to use, expensive, and more difficult to install than even Windows 95. Small sheetfeds, on the other hand, looked quick, nimble, easy to use, and cheap. But maybe things had changed.

The only way to get the real scoop was to write a review of flatbed and sheetfed scanners. ▶

PHOTOGRAPH BY ERIC TUCKER

I asked my editor, and—get this—he agreed. So I spent a month crammed into my home office with eight flatbed scanners (from Acer, Agfa, Epson, Hewlett-Packard, Microtek, Plustek, Polaroid, and Umax) and three sheetfeds (from Logitech, Storm Technology, and Visioneer). The Acer, Agfa, Epson, HP, and Polaroid scanners connected to my PC via internal SCSI cards, which are included with each unit; the rest used parallel port connections. All cost less than $400, and the cheapest, Acer's AcerScan Prisa 310S, costs only $119.

Now, after spending time with these 11 models, I've discovered that flatbed scanners have changed dramatically—and for the better. The longer I used them, the more my skepticism disintegrated. They are now genuinely useful peripherals for typical PC users. Heck, I'd even recommend one to my mom (and I'm the guy who provides her with phone support).

Why have flatbeds become more attractive? For one thing, prices have tumbled; you can pick up a decent one for under $150, hundreds of dollars less than you would have spent a year ago (and less than you'll pay for most sheetfeds). And inexpensive doesn't mean poor quality—some low-cost flatbeds give you surprisingly good images. At the same time, manufacturers have added lots of useful software, so scanning is less complex and more fun. And many flatbeds have shrunk in size, with some units no larger than a personal laser printer.

Among the flatbeds here, Epson's $249 Perfection 600 is the Best Buy, thanks to its good image quality, easy-to-use design, and superior software bundle. Sheetfeds too are worth considering, especially if space is tight. They're still much more compact than any flatbed, and are terrifically convenient for quick jobs like sending a fax or making a copy. Among sheetfeds, Logitech's $299 FreeScan is the Best Buy; it's the fastest one here and comes with a handy document feeder.

SCANNING FOR BUSINESS AND PLEASURE

MY JOB WAS TO see how well each product was suited to a variety of typical tasks. For starters, I unplugged my fax machine and faxed pages from my PC instead. I also scanned photos and other images for presentations and for my newsletter. And I imported articles from journals (with permission) by using the bundled optical character recognition software to convert pages into text that I could edit in a word processor. For fun, I created photo calendars and cards with bundled software.

My test system for all these jobs was a 166-MHz Pentium PC running Windows 95, with 48MB of RAM, a ViewSonic PT775 17-inch monitor, a Diamond Stealth video card, and an Alps 2300 color printer. While I worked in my home office, the PC World Test Center did a lab-style examination of each scanner's speed and image quality, judging reproduction fidelity with a color-corrected monitor in a neutrally lighted environment.

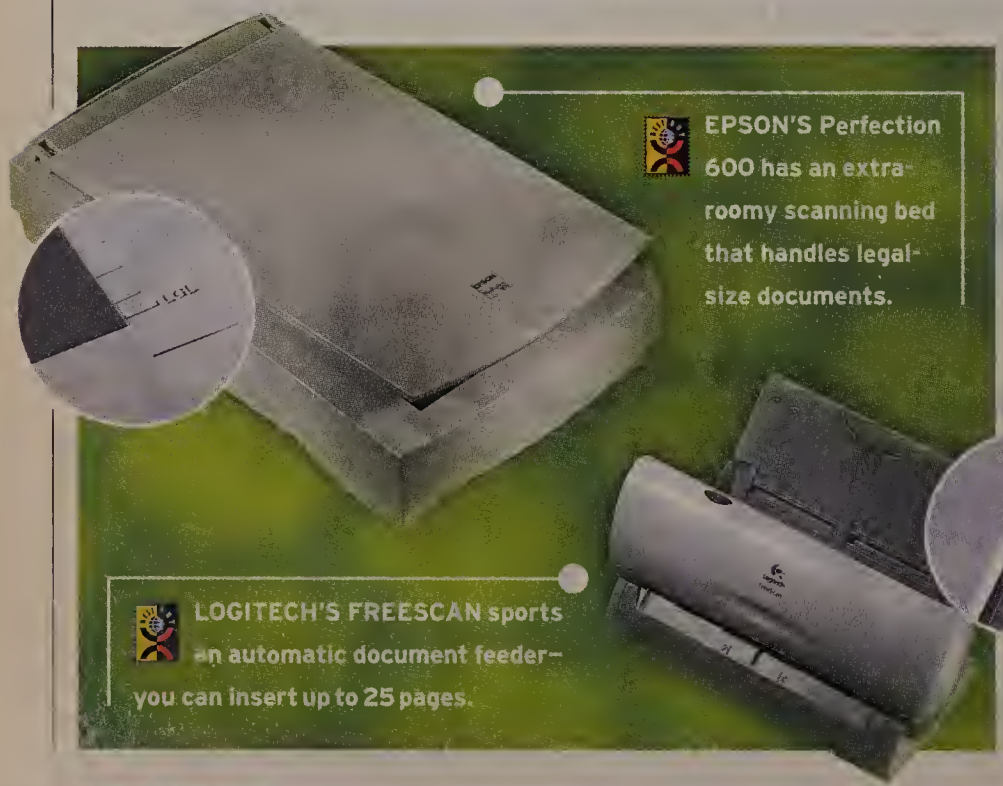
GETTING CONNECTED

I'M HAPPY TO report that all the parallel-port scanners were up and running just minutes after I attached the cables. That's because most came with quick-start guides—Plustek's was among the best—and with well-marked connections. Each had a pass-through connector that let me attach both the scanner and printer to my PC's parallel port.

I also use my parallel port for an Iomega Zip drive; fortunately, my PC has an Enhanced Parallel Port. Thanks to the EPP connection—and much to my astonishment—I was able to daisy-chain the scanners with the printer and Zip drive, and everything worked properly.

Of course, I couldn't get the same arrangement to work on my wife's older PC. The culprit? An ancient parallel card. And don't try to scan and, say, simultaneously print or access a Zip drive—doing so caused my system to crash.

There's no arguing that installing a SCSI scanner takes extra work: You have to open the computer's case to insert a SCSI card, and you may need to fiddle



EPSON'S Perfection 600 has an extra-roomy scanning bed that handles legal-size documents.

LOGITECH'S FREESCAN sports an automatic document feeder—you can insert up to 25 pages.

best BUYS

OF THE 11 SCANNERS here, one flatbed and one sheetfed emerged as Best Buys. Epson's $249 Perfection 600 SCSI flatbed is easy to set up and use, delivers good scan quality, and comes with a first-rate collection of software. If you're in the market for a sheetfed model, Logitech's $299 FreeScan shines for its quick performance, versatility, and extremely useful 25-page automatic document feeder.

Among parallel port flatbed models, Microtek's $149 ScanMaker V300 merits honorable mention by providing excellent image quality at a very reasonable price, and its automated scanning features do image tweaking well.

with jumpers or tackle system interrupt conflicts. Acer's, Epson's, and HP's SCSI scanners were all relatively painless to set up. But with Polaroid's unit, I spent a lot of time resolving conflicts.

On the plus side, the SCSI flatbeds were the fastest performers overall: The quickest one, Agfa's SnapScan 600, took only 17 seconds to scan a color photo at 300 dots per inch, while Microtek's parallel port–based ScanMaker V300 needed over a minute to do the same thing. And with a SCSI unit, you won't have to worry about not being able to print while scanning, or vice versa.

SHEETFED OR FLATBED?

WHEN CHOOSING between flatbeds and sheetfeds, ask yourself what you will use your scanner for most often, and how much room you can spare. Let's say you scan lots of black-and-white pages for faxing or OCR, and occasionally need to import a photo into a newsletter. Your best bet is a sheetfed unit, especially if you're short on space. (Even the smallest of the flatbeds here, Umax's 11.5-by-16.4-inch Astra 610P, still eats up more than twice as much space as the sheetfeds.)

Sheetfeds also let you scan multipage documents—say, a fax—with a minimum of fuss. While a flatbed may do the actual scan faster, there's the hassle of lifting the lid and waiting for the scanner to warm up; most of the flatbeds took about 30 seconds, and the Umax Astra 610P even longer. Quickly inserting pages into a sheetfed unit is much more convenient.

But if you want to scan lots of photos, choose a flatbed. None of the sheetfeds I tested compared with the best flatbeds for accurate color reproduction. Also, the sheetfeds too often grabbed photos at an angle, resulting in a crooked scan.

scan COMPARISONS

DON'T EXPECT any low-cost scanner to give you picture-perfect image quality. But some models come a lot closer to hitting the mark than others. Here are samples from the scanners that rated best and worst in our image-quality tests, plus the two Best Buys. All were scanned at the default settings; you might improve quality by using on-screen controls or bundled software.

POLAROID'S CS-300LE does best at matching the flesh tones of the original photo, although its scan is still a bit dark.

ACER'S ACERSCAN PRISA 310S greatly exaggerates the photo's contrast; shadows are too dark, and light areas are washed out.

EPSON'S PERFECTION 600 falls short of the Polaroid's fidelity—it's too red—but captures the photo's details well.

LOGITECH'S FREESCAN scans well enough for casual photo work, although it gave this photo subject a sunburned look.

Image Quality Ratings

VERY GOOD
- Polaroid CS-300LE

GOOD
- Agfa SnapScan 600
- Epson Perfection 600
- HP ScanJet 5pse
- Microtek ScanMaker V300
- Storm EasyPhoto SmartPage Pro
- Umax Astra 610P

FAIR
- Logitech FreeScan
- Plustek FBIV
- Visioneer PaperPort Strobe

POOR
- Acer AcerScan Prisa 310S

Image-quality ratings are based on scans of color photographs at 75, 300, and 400 dpi, a 300-dpi gray-scale photograph, and a 400-dpi text and line art page, using a scale from Excellent to Poor.

Flatbeds also scan material from books or magazines as easily as a photocopier does. By contrast, Visioneer's PaperPort Strobe sheetfed can't scan bound items at all, and the job is somewhat ungainly with the Logitech and Storm units.

GOOD COLOR TAKES WORK

JUST ABOUT EVERY scanner I used captured photos that looked like, well, photos. But no unit could be relied on to capture a photo's color and detail with perfect fidelity. I often had to resort to major futzing—adding or removing contrast and tweaking colors—to get a color scan that really looked like the original. (Thankfully, all the models automatically produced crisp, reasonably accurate renditions of black-and-white pages of text and line art.)

Because many scanners tout resolutions as high as 4800-dpi, I thought that higher resolutions would give me better quality. Nope. All they did was create humongous files—35MB and up—and slow my system to a crawl. Scanning at 240, 300, or 350 dpi works well if you plan to print the image with a personal printer. And if you're scanning images for on-screen use (say, in a Web page), 78 dpi is usually fine. Most of the units here have an optical ▶

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- 32x Max EIDE CD-ROM
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- Ensoniq AudioPCI™ 32-bit Sound
- Altec Lansing ACS90 Speakers
- Microsoft Office 97 SBE & Max's Business Pack

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- 6.4GB Ultra ATA Hard Drive
- STB Velocity 128 PCI 4MB SGRAM Video Card
- 17" (15.7" VA) 1280x1024 Color Monitor
- 32x Max EIDE CD-ROM
- K56flex™ Voice/Fax Modem, Speakerphone
- Ensoniq AudioPCI™ 32-bit Sound
- Altec Lansing ACS45 Powercube Speakers & Subwoofer
- Microsoft Office 97 SBE & Max's Business Pack

Cyrix 233+.....$1749

Max It! $99

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- 3DLabs Permedia 2 AGP 8MB SGRAM Video Card

D203

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- 32MB SDRAM ❖ 512 Pipeline Burst Cache
- 4.3GB Ultra ATA Hard Drive
- STB Nitro 3D PCI 4MB EDO DRAM Video Card
- 15" (13.7" VA) 1280x1024 Color Monitor
- 24x Max EIDE CD-ROM
- K56flex™ Voice/Fax Modem, Speakerphone
- Ensoniq AudioPCI™ 32-bit Sound
- Altec Lansing ACS90 Speakers
- Corel WordPerfect Suite 8 & Max's Business Pack

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D205

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D208

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- 16 Bit Sound
- NiMH Battery
- Infrared Port
- Corel WordPerfect Suite 8

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D207

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- 12.1" XGA Active Matrix Display
- 32MB EDO
- 256KB PB Cache
- Chips and Technology 65550 w/ 2MB
- 2.1 GB ATA Hard Drive
- 20X Max CD-ROM
- 56K PCMCIA Modem
- 16 Bit Sound
- NiMH Battery
- Infrared Port
- Corel WordPerfect Suite 8

Configured with AMD K6 200MHz w/MMX™
- 13.3 XGA Active Matrix Display
- Smart Lithium Ion Battery $2599

D206

MobileMax 2

$3999

business lease $130

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- 512KB Pipeline Burst Cache
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- 20X Max CD-ROM (removable)
- Yamaha 3D Wavetable Sound
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resolution of 300 by 600 dpi; superhigh specs refer to *interpolated resolution*, a technique for approximating what a higher-resolution scan would look like.

Five of the units I tested were 24-bit models, capable of capturing 16.8 million colors. Six were 30-bit models, which can capture a *billion* colors. That may lead to more subtle colors under ideal circumstances, but unless you're extremely discerning, 24-bit color is more than good enough. And 30-bit color says nothing about a scanner's ability to produce great results automatically; for instance, Plustek's FBIV tended toward very dark scans unless I adjusted the controls.

SCANNER SOFTWARE

GENERALLY, YOU access a scanner's on-screen controls from within whatever software package you'll use the scanned image in. All the models here use the TWAIN standard, so they work with just about any graphics software. The best controls, such as Epson's and Microtek's, let you preview an image and adjust details such as brightness and contrast before doing the scan.

All the scanners come with an image editing application; my favorite is Adobe's PhotoDeluxe, which is bundled with the Epson, Logitech, Storm, and Umax models. I used these products to work wonders with photos—cropping out areas (and some relatives), retouching scratches on old prints, eliminating red-eye, and creating holiday cards and other projects.

Also standard is "lite" OCR software—usually Caere's OmniPage or Xerox's TextBridge—for converting scanned documents into text that you can edit in a word processor. Both of these packages produced reasonably accurate results from plain-text documents that were in good shape. But for demanding jobs such as OCR on ninth-generation photocopies or pages from *People* magazine, you'll want to upgrade to the full versions of these packages. Many of the scanners also come with document management applications, such as Visioneer's PaperPort or DocuMagix's PaperMaster; these programs are particularly helpful if you're scanning scads of images and want to keep them neatly organized.

TRADE-OFFS REMAIN

NO SINGLE SCANNER here is a hands-down winner in every respect—you'll still need to make trade-offs between scan quality, speed, size, ease of use, and price. Even the Best Buys aren't without their weaknesses: Epson's Perfection 600 is one of the slower SCSI models, and Logitech's FreeScan does a merely adequate job of reproducing photos.

Still, the bottom line is clear: A good scanner can be a tremendously valuable tool for your business desktop. And at these prices, they're almost an impulse purchase—something you'll pick up along with a box of floppy disks and some backup tapes.

I OFTEN HAD TO RESORT TO **major futzing** TO GET A **color scan** THAT LOOKED LIKE THE ORIGINAL.

SCANNERS — FEATURES COMPARISON

	MODELS	BASICS: Street price	Connection type [1]	Windows versions supported [2]	Scanner width x depth x height (inches)	Maximum optical resolution (dpi)	Maximum enhanced resolution (dpi)	Maximum color depth (bits)	Maximum document size (inches)
FLATBED	Acer AcerScan Prisa 310S	$119	SCSI	95, 3.1, NT 4.0	12 x 18 x 3.3	300 x 600	4800 x 4800	30	8.5 x 11.7
FLATBED	Agfa SnapScan 600	$399	SCSI	95, 3.1, NT 4.0	14.8 x 20.9 x 5.5	600 x 1200	4800 x 4800	24	8.5 x 11.7
FLATBED	Epson Perfection 600	$249	SCSI	95, 3.1, NT 4.0	12.7 x 21.7 x 5.1	600 x 600	4800 x 4800	30	8.5 x 14
FLATBED	HP ScanJet 5pse	$299	SCSI	95, 3.1	12 x 19.1 x 4.9	300 x 300	1200 x 1200	24	8.5 x 11.7
FLATBED	Microtek ScanMaker V300	$149	parallel port	95, 3.1, NT 4.0	11.5 x 17.3 x 3.2	300 x 600	4800 x 4800	24	8.5 x 11
FLATBED	Plustek FBIV	$149	parallel port	95, 3.1	11.7 x 16.7 x 3	600 x 1200	9600 x 9600	30	8.5 x 11.7
FLATBED	Polaroid CS-300LE	$229	SCSI [3]	95	13.5 x 20 x 5.5	300 x 600	2400 x 2400	24	8.5 x 13.5
FLATBED	Umax Astra 610P	$129	parallel port	95, 3.1, NT 4.0	11.5 x 16.4 x 3.9	300 x 600	4800 x 4800	30	8.5 x 11.7
SHEETFED	Logitech FreeScan	$299	parallel port	95	12.5 x 6.3 x 8.3	600 x 600	4800 x 4800	30	8.7 x unlimited [4]
SHEETFED	Storm EasyPhoto SmartPage Pro	$199	parallel port	95, 3.1	11.5 x 5.5 x 3.5	300 x 600	5000 x 5000	30	8.5 x 14
SHEETFED	Visioneer PaperPort Strobe	$249	parallel port	95	11 x 2.5 x 2	300 x 300	2400 x 2400	24	8.5 x 30

Best Buy ● Yes ○ No

[1] All SCSI models include SCSI adapter.
[2] By software drivers; bundled applications may vary.
[3] As tested; replaced with parallel port version at press time.
[4] Length limited only by disk space.

flatbed SCANNERS

ACER'S ACERSCAN PRISA 310S is cheap and quick, but scan quality is so-so at best.

THE LID ON Agfa's SnapScan 600 isn't securely fastened to the scanner, and if you're not careful, it can come completely loose.

PHOTOGRAPH: KEVIN CANDLAND

Acer AcerScan Prisa 310S

PRO: Great price, fast scan speed, toll-free technical support available around the clock.

CON: Marginal image quality, limited selection of bundled software.

When I saw the Prisa 310S's $119 price tag, I did a double take. That's remarkably inexpensive, especially for a SCSI flatbed scanner. And despite its bargain-basement price, the Prisa flies—it was second overall in our speed tests, after the Agfa.

With that low price and great speed in mind, I kept my fingers crossed that everything else about the Prisa was as good. Unfortunately, it scored lowest of all 11 models in scan quality. Photos were too dark—in some, faces had unnaturally high contrast—and even gray-scale samples lost detail because of contrast problems. Some experimenting with the bundled IPhoto Plus software helped, but it often took 10 minutes of extra work to make the images look almost acceptable.

I was able to install the Prisa in a reasonable 20 minutes, using a posterlike quick-start guide. The unit is sturdily built, although the on/off switch is hard to reach. You can detach the lid to work with thick books, and warm-up time is average at 30 seconds. Besides IPhoto Plus, Acer bundles only TextBridge for OCR. *$119, Acer, 800/369-6736, www.acer.com/aac/*

READER SERVICE NO. 699

Agfa SnapScan 600

PRO: Very fast, good scan quality.

CON: Arduous setup, most expensive model here.

Agfa's $399 SnapScan 600 flatbed combines exceedingly fast performance with respectable image quality, but it was still frustrating to work with. Getting it set up was exhausting; because I didn't have Win 95's CD-ROM AutoRun capability turned on, I had to hunt through PC and Mac ▶

BUNDLED SOFTWARE				SERVICE AND SUPPORT					
Image editing	Optical character recognition	Document management	Other	Warranty (years)	Free technical support	Toll-free phone support	Weekday support (hours)	Weekend support	E-mail support
IPhoto Plus	TextBridge	–	–	1	lifetime	●	24	●	●
IPhoto Express	OmniPage	PaperPort	color correction, copy utility	1	first year	○	11	○	●
PhotoDeluxe	TextBridge	PaperPort	PageMill	1	lifetime	●	12	●	●
Photo-Paint Select	OmniPage	PaperPort	WebGraphics Suite	1	first year	○	16	●	○
IPhoto Express	OmniPage	PaperMaster	–	1	lifetime	○	10	○	●
Picture Publisher	TypeReader	–	copy and fax utility	1	lifetime	●	9	○	●
PhotoFix	OmniPage	–	–	1	lifetime	●	12	○	○
PhotoDeluxe	OmniPage	Presto PageManager	copy utility, Presto PhotoAlbum	1	lifetime	○	15	●	●
PhotoDeluxe	TextBridge	PaperMaster	fax and copier utility	1	lifetime	○	8	○	●
EasyPhoto, PhotoDeluxe	TextBridge	PaperMaster	photo organizing software	1	lifetime	○	10	●	●
PhotoEnhancer	TextBridge	PaperPort	CardScan SE, Quicken ExpensAble SE, QuickCards LE	1	setup only [5]	●	9	○	●

[5] Other calls may be subject to $19.95 fee.

directories in assorted languages to launch the installation software.

The SnapScan is big—20 inches long by almost 15 inches wide. I liked being able to adjust its lid to scan large books, but unlike the ScanMaker's lid, it didn't have stops to prevent me from accidentally lifting it right out of its guides. A minor flaw, but an annoying one, especially in the highest-priced scanner here.

Still, the SnapScan's performance was outstanding. Overall, it was 40 percent faster than the AcerScan Prisa, the second-fastest SCSI model, and 70 percent quicker than Plustek's FBIV, the fastest parallel port model. The Agfa scanned our gray-scale photo at 300 dpi in 7 seconds—more than twice the speed of any other unit. Only with our 400-dpi text/line art page did it lag, trailing the ScanJet by 11 seconds. Image quality was good, though some scans were a little dark or fuzzy.

Agfa's respectable software includes PaperPort for document management, OmniPage for OCR, IPhoto Express for image editing, and a copier utility. *$399, Agfa, 800/685-4271, www.agfa.com*

READER SERVICE NO. 700

Epson Perfection 600

PRO: Good scans, excellent software, handles legal-size documents, unlimited toll-free support.

CON: Relatively expensive, big.

The $249 Perfection 600 is a good choice for just about any scanning task, making it the Best Buy among flatbeds. To begin with, it's got an outstanding software bundle. Visioneer's PaperPort is a first-rate document manager, and Adobe's PhotoDeluxe image editor and PageMill Web authoring tool are both great. TextBridge is included for OCR. On-screen controls provide lots of ways to adjust colors; most times, however, I set the driver to automatic.

A poster guided me through setting up the SCSI-based Perfection, and the unit came with a SCSI terminator—a doohickey that's sometimes needed when multiple SCSI devices are attached to a PC. The Epson is big, but it's the only flatbed here that can scan legal-size documents.

The Perfection was a tad slower than some SCSI flatbeds, but still much speedier than the parallel port units. Scan quality is good, though not as impressive as the Polaroid model's. Some images looked dark—I had to lighten one snapshot.

Though the Epson is not dirt cheap, it offers lots of bang for the buck. If your budget's tight, consider the $149 ScanMaker V300 instead. *$249, Epson, 800/463-7766, www.epson.com/home.shtm*

EPSON'S PERFECTION 600 **isn't dirt cheap**, BUT IT STILL **offers lots** OF BANG FOR THE BUCK.

Hewlett-Packard ScanJet 5pse

PRO: Excellent software, above-average performance, good scan quality, long support hours.

CON: On the pricey side, weak on-screen controls, phone support entails a toll call.

It's one of the more expensive flatbeds here, but Hewlett-Packard's $299 ScanJet 5pse does well in most areas. As SCSI models go, it was easy to set up—HP takes care in explaining how to install the adapter card and the cabling. The ScanJet warms up almost immediately, and pressing a button on the front brings HP's PictureScan Task Manager onto the screen. You can then scan a document and fax it, run it through OCR, or send it as e-mail. ▶

TEST REPORT

Agfa Flatbed Is Speediest

Five fastest units use SCSI; Logitech is quickest sheetfed.

HOW WE TEST All scanners are tested with default settings under Windows 95 on a Dell Dimension Pentium MMX-200 PC with 32MB of RAM, using each scanner's bundled software. Speed tests are timed from the start of scanning until cursor control is regained. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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Flowcharts

Software installation is a snap, and the bundle is impressive: Photo-Paint Select supplies image editing, PaperPort handles documents, and OmniPage turns scanned documents into text. And Corel's WebGraphics Suite takes care of Web authoring. But on-screen controls need improving. The preview mode has few options—I could only sharpen or crop images. To change resolution, I had to pretend I had a 1200-dpi printer, a pretty silly method.

The ScanJet came in third overall in our speed tests, just behind the AcerScan. It did well in our image-quality tests, but it wasn't free of glitches—some flesh tones looked too yellow, and the water in a swimming pool was unnaturally intense in color. *$299, Hewlett-Packard, 800/752-0900, www.hp.com/go/scanjet*

READER SERVICE NO. 701

Microtek ScanMaker V300

PRO: Low price, good image quality, quick installation, unlimited free weekday support.

CON: Slow compared to SCSI models, no weekend or toll-free support.

How much scanner can you buy for $149 these days? In the case of the ScanMaker V300 flatbed, quite a bit. Its overall performance lags far behind that of SCSI models here, but it was among the fastest parallel port units for color and black-and-white images at 75 and 300 dpi. And when it comes to scan quality, it's second only to the Polaroid CS-300LE. Flesh tones in some photos had a slight yellow tinge, but images were usually crisp and fairly true to the originals.

Installation went quickly, and the scanner is sturdy and reasonably compact. I like the way its lid slides up on two posts, making it easy to scan thick items. Warm-up time is under 30 seconds—quicker than average for a flatbed.

The ScanMaker is on the noisy side, though, and every so often when I changed settings, my scan would come up with no image. I was tempted to blame El Niño, but the problem was due to a driver bug. I solved it with a reset option in the on-screen controls.

Microtek's automated scanning features usually tweaked images with good results. If it didn't, I improved them myself using the included IPhoto Express, a terrific image editor. The scanner's software bundle also includes OmniPage for OCR and PaperMaster for document management. *$149, Microtek, 800/654-4160, www.microtekusa.com*

READER SERVICE NO. 702

Plustek FBIV

PRO: Quick installation, small footprint, fast for a parallel port scanner, toll-free tech support.

CON: So-so scan quality.

My first impressions of the $149 FBIV flatbed were good. It's nice and compact—not much bigger than my laser printer. It's got a rugged metal base, and since it's a parallel port model, it installed easily.

Like HP's ScanJet, the Plustek has a handy button on the case that immediately launches its software for faxing, OCR, and other chores. Plustek supplies Micrografx's Picture Publisher—an image editor that's powerful but somewhat tough to learn and use—as well as ExperVision's TypeReader OCR software. You also get a utility to scan directly to the printer and send images through your PC's fax software.

Overall, the Plustek FBIV was the fastest of the parallel port–based flatbeds, although it was still much slower than the SCSI models. A color photo took about 20 seconds at 300 dpi; a gray-scale photo at the same resolution took 37 seconds. In our image-quality tests, it didn't fare so well: Photos looked consistently dark. When I realized that the default settings were too extreme, I was able to perform photographic resuscitations by fiddling with the on-screen controls. *$149, Plustek, 800/685-8088, www.plustekusa.com*

READER SERVICE NO. 703

Polaroid CS-300LE

PRO: Best image quality of any scanner here, unlimited toll-free tech support.

CON: Difficult to install, slowest of all SCSI flatbeds, large.

Among all the scanners evaluated here, the $229 CS-300LE came the closest to matching the original colors of photos and other images at the default settings. So it's too bad that this unit is a hassle to install and was the slowest overall of the SCSI flatbeds in our tests: Scanning a 300-dpi color photo took a minute and ▶

MICROTEK'S SCANMAKER V300 will set you back only $149, but its image quality is among the best of the scanners reviewed here.

A BUTTON on HP's ScanJet 5pse launches the software for quick image captures.

PLUSTEK'S FBIV is quick for a parallel port flatbed and sturdy; scans tend to look dark at its default settings.

PHOTOGRAPH: KEVIN CANDLAND

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a half, compared with a mere 17 seconds for the Agfa SnapScan 600.

I had to rearrange items in my office to make this oversize scanner fit. And installing it gave me—well, added to my—gray hairs. The switch that's used to set the SCSI ID (every SCSI device needs its own ID number) is tiny and didn't match the diagram in the test unit's documentation, making it hard to set. Also, the scanner didn't include a SCSI terminator, a gizmo you may need to daisy-chain multiple SCSI devices; the documentation suggests that you buy one if necessary. (I couldn't even boot my PC without one.)

Another big problem: PhotoFix, the bundled photo editor, can't open any file over 12MB in size. That's a fatal flaw when doing high-resolution projects, since files containing images at 300 or 400 dpi are often far larger than that. Considering the setup annoyances I faced, it's probably good news that at press time Polaroid had replaced the SCSI-based CS-300LE with a parallel port version. The new model wasn't available in time for this review. *$229, Polaroid, 800/662-8337, www.polaroid.com/digi-world/*

READER SERVICE NO. 704

Umax Astra 610P

PRO: Low price, most compact flatbed, good scan quality, long weekend support hours.

CON: Slowest overall scanning performance of all flatbeds here, no toll-free support.

If you're buying a flatbed scanner on a budget, Umax's $129 Astra isn't a bad choice, although I'd spring for Microtek's $149 ScanMaker V300 instead. The Astra did a decent scanning job, even though I had to lighten some images and change the contrast on others. On occasion, the preview mode would display photos that looked fuzzy or washed out. Yet when I went ahead with the scan, the photo looked good. Go figure. The controls for tweaking images are easy to use, which is helpful because the autoadjustment features don't do much to correct problems.

Overall, the Astra was the slowest of all flatbeds in our tests, doing poorly with 75-dpi color photos and 400-dpi black-and-white shots, but rating better with 300-dpi gray-scale samples. Also, it seemed to take forever to warm up, and it needed to do so frequently.

UMAX'S ASTRA 610P would be easier to use if its markings were a different color—they're tough to see.

GREAT COLOR QUALITY is the one outstanding feature of Polaroid's CS-300LE.

The Astra 610P is the smallest flatbed in this review. I was able to get it up and running in under 15 minutes, thanks to its parallel port connection and quick-setup guide. Like the HP and Plustek models, it's got a nifty button that lets you easily launch its scanning software. But I wish the measurements along the edge of its scanning area were in color—they'd be much easier to read.

Given the scanner's low price, Umax bundles a surprisingly generous software collection: You get PhotoDeluxe; Presto PageManager; OmniPage OCR; and applications for organizing photos and copying. *$129, Umax Technologies, 800/562-0311, www.umax.com*

READER SERVICE NO. 705

sheetfed SCANNERS

Logitech FreeScan

PRO: Fastest sheetfed unit, automatic document feeder, scans bound documents, good software, unlimited free tech support.

CON: Photographic scan quality is just fair, large for a sheetfed, phone support is not toll-free.

Sheetfed scanners can't compete with flatbeds for high-quality photo imaging, but they're still great tools for general business use. The versatility of Logitech's $299 FreeScan makes it the Swiss army knife of scanners, and a Best Buy among sheetfeds. It installed with a minimum of effort, and although it's the bulkiest of the sheetfeds, it still didn't take up much room on my cluttered desktop. The parallel port pass-through connector has over 7 feet of thin cable that supplies the FreeScan with both data and power; that's long enough to let you place the machine halfway across the room (yep, my office *is* really small).

What sets the FreeScan apart from the other sheetfeds here is its flexible design. When I have to scan items for faxing, its automatic document feeder handles up to 25 pages at a time. As with other sheetfeds, I can also quickly stick in a single document or photo and have the FreeScan process it. I'm also delighted with its motorized scanner head: I simply lift it off the base, place it over delicate photos (or bulky magazines), and scan.

Overall, the FreeScan was the fastest of the sheetfed units in our tests, scanning a color photo at 75 dpi in a swift 11 seconds. If you need to scan a long newspaper clipping, this model is perfect: It handles documents of almost any length, provided you have sufficient disk space. But the FreeScan, like the other sheetfeds, sometimes grabbed my photos at an angle, resulting in crooked scans. And while it handles black-and-white images capably, high-grade photo imaging isn't its strength—some photographs looked dark, with occasional reddish tints. (I used the on-screen controls and photo editing software to fix things up.) ▶

PHOTOGRAPH: KEVIN CANDLAND

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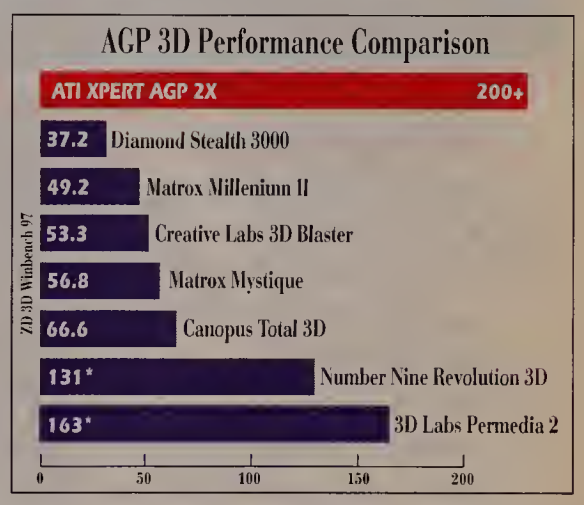

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3D Performance Comparison graph: Tested on Pentium II MMX-266MHz/32M8/512 cache/ Windows95-OSR2 Test Mode: 640x480x16bpp@75Hz - Tested using Driver Version: ATI XPERT AGP 2X 4.10B8H+/Diamond Stealth 3000 4.03.00.3205/Matrox Millenium II 4.03.3600/3D Blaster 4.02.020/Matrox Mystique 4.03.00.3410/Canopus 4.03.00.9001 *Reported results.

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The FreeScan's Control Center software launches automatically when you insert a page, letting you transmit the document as a fax, send it to the printer for a copy, or put it into the PaperMaster file management system. The FreeScan also comes with the TextBridge OCR package and PhotoDeluxe imaging software. Windows 3.*x* users are out of luck, though, as the FreeScan operates only under Windows 95. *$299, Logitech, 800/732-3039, www.logitech.com*

READER SERVICE NO. 706

Storm EasyPhoto SmartPage Pro

PRO: Good color, bountiful software bundle, least-expensive sheetfed, unlimited free tech support.

CON: Trouble scanning some photo prints, tech support isn't toll-free, bulky connector.

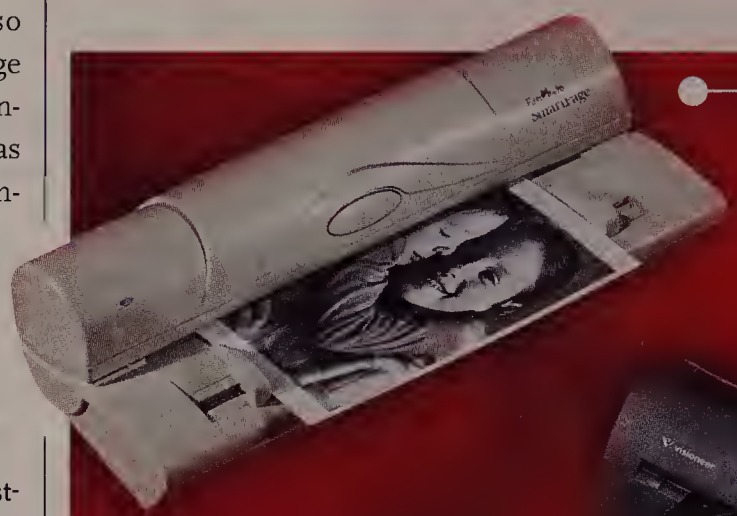
Storm Technology's $199 EasyPhoto SmartPage Pro is small and easy to use, and it has the best image quality of the sheetfeds here. But it's slower than the FreeScan, with a few flaws that keep it from being an out-and-out winner. For starters, the bulky pass-through device that connects the scanner to your PC attaches directly to the PC's parallel port—a less elegant design than that of the Logitech and Visioneer sheetfeds, which can lie on either the floor or the desktop.

The scanner comes with a nice software bundle, including both EasyPhoto for basic picture manipulation and PhotoDeluxe for more advanced image processing. You also get PaperMaster for document management and TextBridge for OCR. You can pull the scanner off its base and roll it by hand across books and magazines; unlike the other sheetfeds, though, it can handle documents only up to 14 inches long, which rules out scanning long clippings from newspapers.

The scanner's color accuracy is good for a sheetfed unit: A photo of a patch of grass had the correct green color, and a shot of a crowd of people was pleasingly realistic. Performance is moderately quick. For example, it took 25 seconds to scan a color photo at 75 dpi, and 62 seconds at 300 dpi.

One weird drawback to this scanner: If your photos use Fujichrome paper, you'll need to use the included transparency sleeve, or the SmartPage's rollers will stick to the paper. See page 106 for a look at Storm's $149 EasyPhoto ImageWave flatbed. *$199, Storm Technology, 888/438-3279, 650/691-6600, www.stormtech.com*

READER SERVICE NO. 707



STORM'S EASYPHOTO SMARTPAGE PRO produces the best photo scans of any sheetfed here.

EVEN FOR A SHEETFED, Visioneer's PaperPort Strobe is remarkably compact, smaller than a submarine sandwich, but it can't scan bound items.

Visioneer PaperPort Strobe

PRO: Ultracompact, superior software bundle, very fast text scans.

CON: Slow high-resolution scans, mediocre color quality, free support for setup only.

Visioneer's $249 PaperPort Strobe is smaller than an egg carton—tiny enough that I can stash it just about anywhere. Even its AC adapter is petite, so it won't block two or three power plugs.

The PaperPort software makes it an easy task to put documents to work in the Strobe's other bundled programs. Once you scan an item onto PaperPort's on-screen desktop, you can simply drag it to your fax software or word processor by way of the TextBridge OCR software. You can also scan business cards and send them to the CardScan SE contact management application, or scan receipts directly into ExpensAble SE. Photos can go to the PhotoEnhancer image editor.

At default settings, the Strobe scans text pages in no time—usually about 4 seconds. It also beat most of the flatbeds in our 75-dpi color photo tests. But high-res scans are sluggish. A scan of a 300-dpi color photo plodded along for about 2 minutes, and a 400-dpi black-and-white text and line art page took 83 seconds.

The Strobe did an adequate job with most images, but a picture of grass was fuzzy, and flesh tones in one photo were pink. As with the other sheetfeds, it sometimes scanned photos at an angle; I fixed them with the bundled software. Ultimately, it's a good business scanner, but a flatbed is a smarter option for serious photo work. (Visioneer also offers two flatbeds: the $179 PaperPort 3000 and the $299 PaperPort 6000. I didn't test them.) *$249, Visioneer, 800/787-7007, www.visioneer.com*

READER SERVICE NO. 708

LIKE OTHER **sheetfeds**, THE STROBE SOMETIMES **scanned photos** AT AN ANGLE.

Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. Performance testing by Dean Andrews and Ulrike Diehlmann.

For more information about all products in this article, circle reader service no. 908. ■

PHOTOGRAPH: KEVIN CANDLAND

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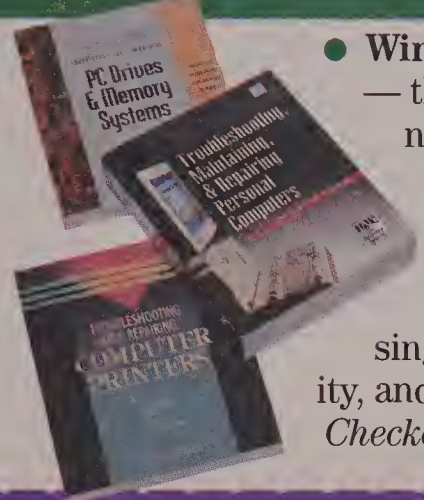

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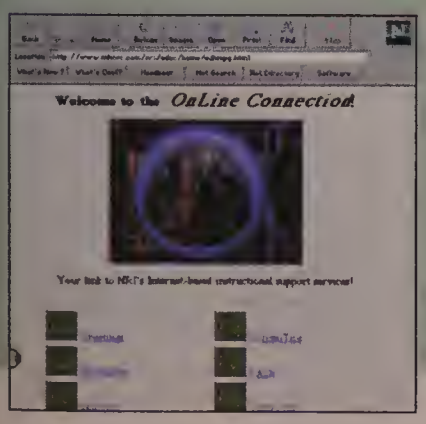

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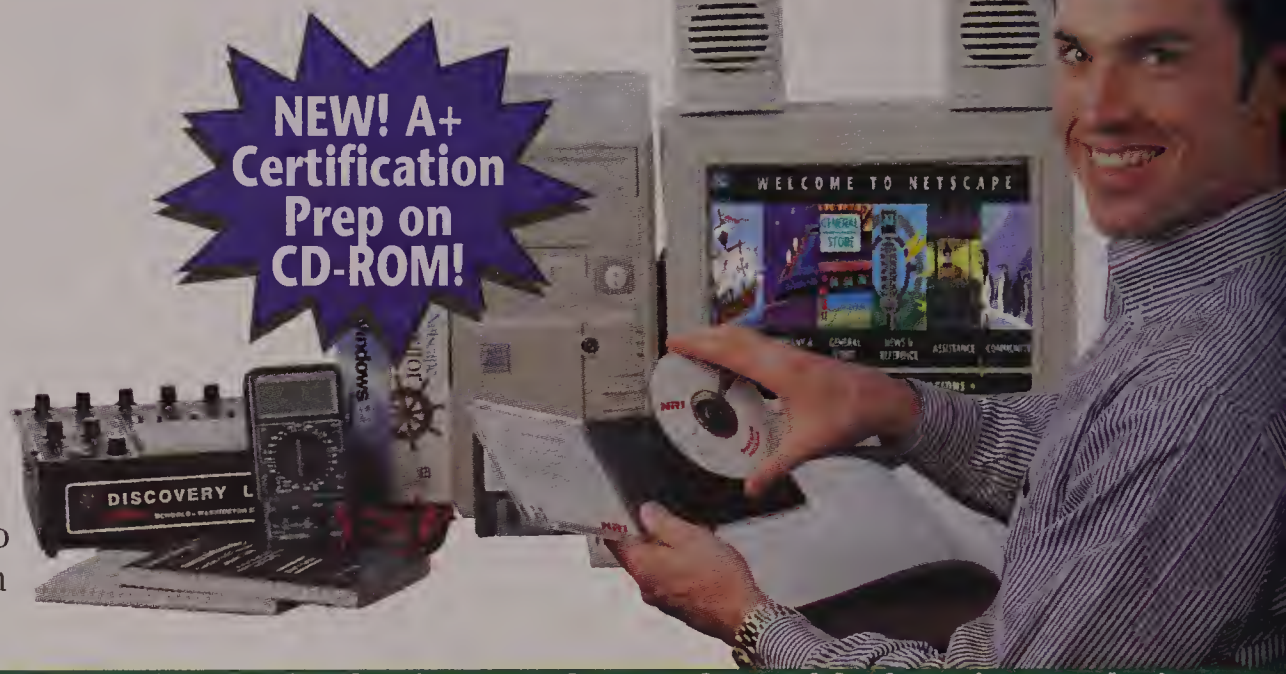

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PETER J. ROMANO • MOUNT VERNON, NY

Why Can't You Get FASTER WEB ACCESS? You Can...

BY BRAD GRIMES

PEOPLE ALL AROUND you are flipping through Web pages like magazines at a dentist's office. They're downloading 10MB files in 1 minute. They're surfing from here to eternity in the time it takes you to read one *Wall Street Journal* article. While you waste time waiting for Web pages to draw, these lucky devils are dating, dining, playing golf, making millions, or at least getting a little more work done.

George Cook is one of the lucky ones. He's an entrepreneur in ▶

...if you live in the right place and are willing to put up with hassles.

ILLUSTRATION BY STUART BRADFORD

Jacksonville, Florida, who gets the Internet funneled to his PC through a cable modem. "I run a lot of multimedia and video off the Internet," he says. "I recently downloaded a 13MB video program in a minute and 20 seconds." For those of you with a 33.6-kilobits-per-second modem, it'll take an hour to download that same file. But don't hate George. It's not his fault.

Whose, then? Ninety percent of American homes have cable running past them. Cable modems aren't brand-new, nor are some of the other high-speed Net connections out there: ISDN, ADSL, and satellite dishes. (For in-depth descriptions, see "Bandwidth on Demand," August 1997.)

All these technologies work, so why were only 354,000 U.S. households using any of them in 1997, according to New York's Jupiter Communications? That's a small fraction of the total homes connected to the Internet. The rest of us either can't afford these services or just can't get our hands on them.

Bobbi Murphy, a former analyst for Dataquest, says most of the holdup has to do with nitty-gritty issues. "It's about time and money," she says. "Think about how long it took to build the telephone system. Upgrading everyone's Net access overnight is like saying we'll upgrade the city sewer system in a year and a half."

But that's not the whole story. We asked analysts and communications company executives why high-speed Internet access isn't universally available. And we found that it's often a matter of corporate priorities. Cable companies are too busy forcing 500 TV channels down our throats; the Baby Bells are slow to push ADSL lines because T1 lines are good business; satellite vendors aren't exactly prepared to serve everyone just yet; and ISDN may already be a thing of the past.

Still, there are people enjoying high-speed connections right now, and we talked to several of them. Although they faced some pitfalls in using these new technologies, everyone agreed on one thing: Speed is good. But for one reason or another, it's hard to find.

Coming to a Home Near You

THE SCOOP **GOOD NEWS:** It's inexpensive, yet it's the fastest thing going—even faster than T1 lines in many cases. **BAD NEWS:** Bandwidth is shared with many users, so there's no guarantee of top speed. Plus, it's available only in certain areas of the country.

STEVE PAULOVICH, a software engineer in Dedham, Massachusetts, has a two-way cable connection in his home. That means he can upload and download files to and from the Web at high speeds.

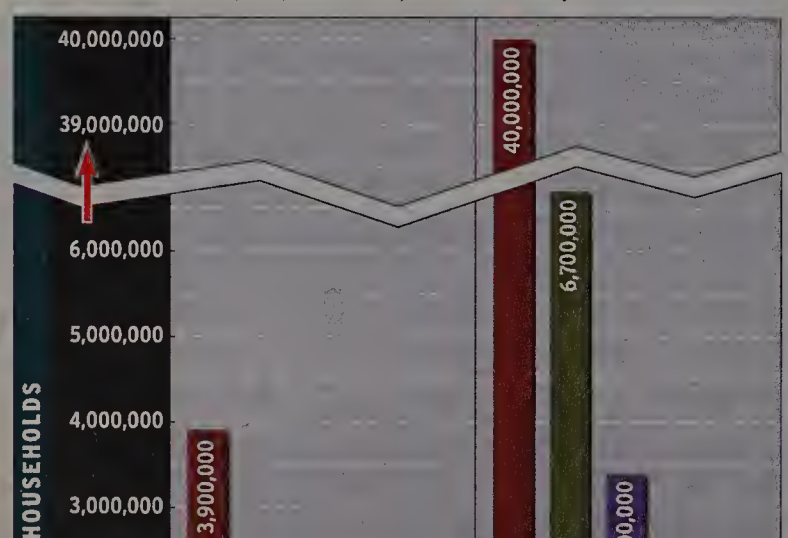
To get this fast connection, Paulovich kept his ear to the ground. "I heard about cable service through rumors and word of mouth," Paulovich says. "When MediaOne [formerly Continental Cablevision] first started their rollout, I called the company immediately and asked if they could set me up. I think I was the first or second installation in Dedham."

Now, for $40 a month, including modem rental, Paulovich has unlimited access to the Internet at speeds that rival—and sometimes surpass—his office's T1 line.

Both Paulovich and George Cook say they're ecstatic with the installation and performance of their cable service. But Cook, because he uses a phone line for uploading, has a few complaints. First of all, he does not have a constant connection

You Will Have Faster Access

IT WON'T BE TODAY, but soon homes and small businesses will connect to the Web at unprecedented speeds as new technologies become more pervasive. Still, millions of people will opt for analog modems.



ACCESS TECHNOLOGY

56 kbps – Comes in two incompatible flavors: x2 and K56Flex.

Cable – It's like cable TV, but it's for your PC; speeds around 1.5 mbps.

ADSL – Like a T1 line, but cheaper; speeds from 192 kbps to 1.5 mbps.

Satellite – Net in the sky at up to 400 kbps–downloading only.

ISDN – Available now, but long in the tooth; speeds up to 128 kbps.

SOURCE: JUPITER COMMUNICATIONS

PHOTOGRAPH: MARK ALCABEZ

to the Net, as cable providers sometimes advertise. "The return phone call is a local call to MediaOne, which acts as my Internet service provider," Cook says. "After five hours of connect time, they kick me off." Cook says he's also been getting busy signals when dialing in to MediaOne over the analog phone line. It's no big deal, Cook says, but he looks forward to upgrading to two-way high-speed service soon.

WHAT'S THE HOLDUP?

ACCORDING TO Jupiter Communications, only 50,000 U.S. homes are connected to the Web through cable lines. The main reason: Cable companies need to upgrade their analog TV networks before they can provide digital Web access.

How a cable company upgrades its system can determine how quickly you get the service. There are two options for cable access: *two-way,* which means data travels to and from your PC over the cable line; or *telco return,* which means Web data flies to your PC over a cable line, but you send files, e-mail, and Web page requests over a standard phone line.

Cable companies are concentrating on adding more **channels** and more **pay-per-view.**

While the latter method is easier to implement, it's only a partial solution.

But even though cable companies have upgraded systems to telco return in many areas, they are probably going to forgo this interim solution for the rest of the country and go straight to two-way lines. Don Apruzzese, MediaOne's director of product marketing, says his company now will simply employ two-way service. "It's a trade-off, and it might extend the waiting period a little bit," he says. "But we think it's better for us to focus on two-way."

Ross Rubin, an analyst at Jupiter Communications, understands why companies like MediaOne and others are proceeding slowly. "For the big guys, who cover 80 percent of U.S. households, [telco return] doesn't make sense," he says. "These companies are willing to wait instead of upgrading their systems and then upgrading them again."

Despite the real problem of upgrading networks, Rubin admits that the slow going of cable Web access has much to do with the cable business in general. The cable companies, he says, "are concentrating on adding more channels and more pay-per-view." Connecting you and me to the Web at blistering speeds isn't a must. Rubin says providing Web access ranks higher on the cable companies' list of priorities than it does on the Baby Bells', but it's still not their core business.

Dean Gilbert, whose company @Home Network has partnered with cable giants Cablevision, Comcast, Cox Communications, and TCI to provide cable Net access, says part of his job is to move the service up cable companies' priorities. "My mission in life is to work with these companies and tell them why it's cool," he says. How much success is Gilbert having with his mission? "We're satisfied right now because the companies are meeting their forecasts [for rolling out cable access]," he answers. Gilbert would not get more specific about those forecasts. But the cable companies themselves predict a complete rollout of cable access by 2000.

The good news: At least one major voice in personal computing has thrown his weight behind cable. Bill Gates's Microsoft has invested a billion dollars in Comcast, and at press time the company was in talks with Time Warner and U.S. West (parent company of MediaOne). The inflow of cash will hopefully help speed the upgrade process and get cable modems into more hands quickly.

WHAT DO YOU DO?

CALL YOUR LOCAL cable operator, or check the map "Where to Find Cable Connections," to see if cable access is available where you live. If the answer is no, there isn't much you can do but wait. (You could pester your cable company in the meantime.) All the big cable firms—Cablevision, Comcast, Cox Communications, MediaOne, TCI, and Time Warner— ▶

Speed Surfing

Tips for Faster Access Now

CAN'T GET YOUR HANDS on a high-speed line to the Internet? Trying to wring every last bit out of your current modem? We've assembled a litany of tips to help you minimize the dreaded World Wide Wait. For files listed here, check PC World Online at www.fileworld.com.

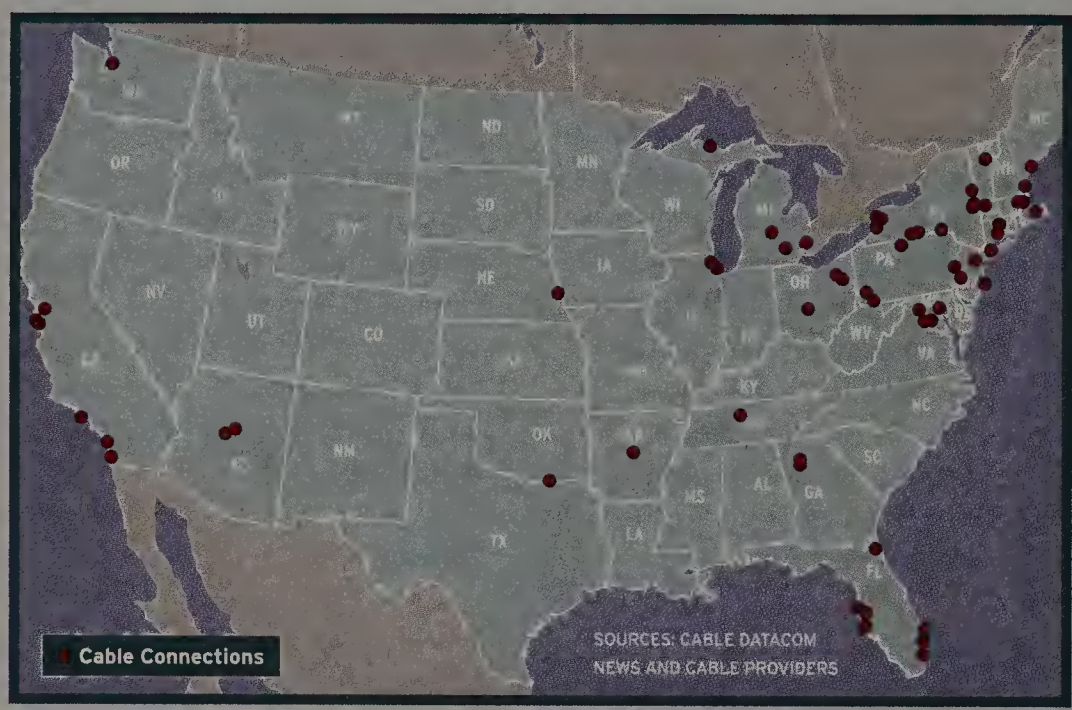
- **Buy a Speedier Modem.** If you're not using a 33.6-kbps or faster modem, you're wasting time. Such a faster modem is not only affordable—a 3Com U.S. Robotics 56K modem costs about $200, a 33.6-kbps version about $90 less—but it's also the easiest way to accelerate Web surfing.
- **Double Up.** You can use two analog phone lines to essentially double your performance, provided your ISP supports this type of connection. If your version of dial-up networking software has *Multi-link* listed under *Properties,* you can move data across two phone lines using two modems. Similar piggybacking is behind new modems from 3Com, Boca Research, and Diamond. Boca's DynamicDuo (about $300) combines the abilities of two 56-kbps modems to achieve speeds up to 112 kbps.
- **Get a Real ISP.** If you're using America Online to surf the Web, stop it. Switch to an ISP that does nothing but deliver the Internet to your PC. IBM Internet Connection (800/821-4612) is one of the fastest ISPs we've tested. Also consider a local ISP—because they serve fewer people, you may be able to jack into the Net more quickly. For a complete rundown of the fastest and most reliable providers, see "ISPs You Can Count On" in the January issue.
- **Tweak Your ISP.** If four months have passed since you installed your ISP's dial-up software, check to see if updates are available. Also, call your ISP's tech support and ask if the its internal server tinkerings might affect older settings for outgoing mail protocols (SMTP) or incoming mail (POP3). A good ISP is constantly upgrading its equipment to take advantage of new browsers, Internet software, and hardware. You should too.
- **Think Locally.** Whenever possible, dial in to the local access number closest to your house. The farther away you have to dial for access, the lower the chances of a speedy *(continued)*

are in the process of rolling out cable Net access. It's just a matter of where and when. If it hasn't been officially introduced in your area, try to find out when your cable operator might be testing the service near you, and volunteer to be a guinea pig.

If you're lucky enough to be in an area that has cable access, make sure your PC is ready for it. To connect the cable, you need an ethernet card. If you don't already have one, your cable company will install one for you. But keep in mind that what the company installs will probably be a slow, inexpensive ISA-based card, and you'll be charged around $100. You can get a faster PCI-based ethernet card (for about $60) and get better performance. Either way, you should make sure you have a free add-in card slot in your machine that is relatively easy to get to. ▶

Where to Find Cable Connections

THOUGH CABLE WEB ACCESS is by no means universal, it seems every week another cable company announces it is rolling out service somewhere. Cable is fast, affordable (about $40 a month), and has a head start on competing technologies like ADSL. Check here to see if cable access is available near you, then call your cable company. Call even if your area isn't listed, because new services start up quickly. *For more details, including some pricing, go to PC World Online at www.pcworld.com/feb98/bandwidth.*



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Speed Surfing

(continued from page 209) connection. If you can't tell from the prefixes which local access number is closest to you, ask your ISP.

● **Test the Waves.** As ISPs begin to support faster hardware like 56-kbps modems, they test the connections in the areas they serve. If you're willing to live with the ups and downs of beta testing, you could get faster Net access right now. Call your ISP and ask to be a beta tester for any new, faster access lines. They may not let you, but as Nana used to say, "If you don't ask, you don't get."

● **Check the Buffers.** If your UART is 16550-compatible and you have Windows 95, try cranking up the Receive Buffer setting. Select *Start•Control Panel*, open *Modems*, click *Properties*, then click the *Connection* tab. Under *Port Settings* drag the sliders up to increase the send and receive buffers and speed up your performance.

● **Hire the Right Driver.** The first step in uncorking a bandwidth bottleneck is to isolate the problem. Is it your modem, phone line, ISP, or the site itself? If you're using a 28.8-kbps or faster modem, first check to see if you have the right driver installed. Select *Start•Control Panel*, then open *Modems* and click the *General* tab. If it's set to 'generic modem', you don't have the right driver. If you see the name of your modem and the correct speed, like 'Motorola ModemSURFR 56K External', you have the right driver installed (but be sure to check the company's Web site for an update).

● **Uncork Your Ports.** If you're using a 33.6- or 56-kbps modem, try changing the port speed to 57,600 or 115,200 bps. Don't forget to make the same changes to the port settings. Select *Start•Control Panel*, then open *System•Device Manager•Ports*. Double-click the COM port that your modem is connected to, and select *Port Settings*. While you're there, make sure the Flow Control setting is set to 'hardware'. This puts your modem (instead of your communications software) in charge of data sent and received.

● **Beat the Traffic.** Just as in real life, cyberspace has rush hours. During off-peak times, you'll log on, connect, and download files faster. The most congested connect time is between 5 p.m. and midnight EST. *(continued)*

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Circle 185 on reader service card

ADSL You Probably Can't Get It

THE SCOOP **GOOD NEWS:** For business, it's cheaper than a T1 line.

BAD NEWS: Availability is extremely limited.

"WE HAVE 76 SCHOOLS serving 60,000 students, and all the schools are totally wired," says Richard Lemon, director of telecommunications for Davis County Schools, north of Salt Lake City. When it came time to speed things up, Lemon says, the school district opted for ADSL because ISDN "was cost-prohibitive."

Davis County Schools was U.S. West's first official rollout of ADSL service. When you read this, almost two-thirds of the schools in the district will be fully upgraded to ADSL. Lemon says he is pleased with the service. The schools use part of the line for accessing the Web and delivering other apps; another part controls things like room temperatures and security.

And the cost? U.S. West offers 320-kbps ADSL connections for $65 per month and 704-kbps service for $125 per month. Compared to ISDN, that's pretty reasonable.

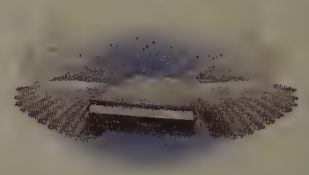
WHAT'S THE HOLDUP?

IT DEPENDS on whom you ask. Joseph Glynn, former director of marketing at U.S. West Enterprise Networking Services, says it's just a slow process. "We needed to get the provisioning systems in place, and the billing systems, and then get the tariffs filed with the state regulatory boards," he says.

But if you ask other companies that want to sell you ADSL connections—namely, local phone companies and Internet service providers—they might tell you a different story.

To use ADSL to connect to the Web, you need an ADSL line running between you and your ISP. To get that line, your ISP must lease it from your regional Baby Bell. But in many areas, those Baby Bells are ▶

Speed Surfing



(continued from page 210)

● **Choose the Road Less Traveled.** Avoid heavily visited Web sites—especially during peak Web hours. For instance, instead of getting your sports news from a popular site like ESPN (espn.sportszone.com), get it from The Sporting News (www.sportingnews.com) or CBS Sportsline (www.sportsline.com).

● **Get in the Zone.** When downloading files that reside on many servers (like Internet Explorer 4.0), don't just pick the server that is closest to you. Instead, select a site in a time zone with *less* Web traffic. So if you live on the East Coast, at 10 a.m. EST download from a site on the West Coast, where it's 7 a.m. Even better: Try a freeware program called Dipstick (www.klever.net). When you're presented with multiple download sites, drag the URLs onto Dipstick and, ta-da, it shows you the fastest link.

● **Call on FTP.** Downloading files from an FTP site can be up to 10 times faster than from a non-FTP server. You can use your browser to access FTP sites, but shareware programs like WS_FTP32 and QuickFTP—part of the Internet Utilities 97 suite from Starfish (www.starfish.com)—are better at managing, opening, and downloading FTP files.

● **Sneak a Web Peak.** Nothing's worse than going to a site, drumming your fingers as the page loads, and finally discovering *(continued)*

WHICH BANDWIDTH OPTION IS RIGHT FOR YOU?

GET...	If you...	Because...	But be aware that...
a 56-kbps modem	don't mind waiting a bit for Web pages to open but still want a little performance boost.	56-kbps modems are among the fastest out there, and many ISPs now support them.	not all ISPs support 56-kbps modems, and many that do support only one of the 56-kbps standards—either x2 or K56flex. A universal standard is due this spring.
cable	need high-bandwidth Net access in your home.	cable service costs just $40 per month, and cable is more than three times as fast as ISDN for Web downloads.	cable access still isn't available everywhere, and unless your cable company provides two-way connections, you need a spare analog phone line for uploading data.
ADSL	need high-bandwidth Net access in your business.	ADSL is cheaper than T1 (though more expensive than cable), and it runs over the telephone wires that you already have.	it will take phone companies a while to roll out digital subscriber lines, and analysts say the companies will concentrate on high-density (metro) markets.
a satellite dish	live in a rural area.	you probably can't get your hands on cable, ISDN, or ADSL, but you can get a satellite dish just about anywhere.	satellite service is expensive, and setting up the dish can be a royal pain. What's more, you need a phone line and a separate ISP for uploads.
ISDN	must have faster Web access right now and live in a relatively populated area.	ISDN service is fast and fairly accessible in areas where telephone companies have lots of switches.	if you live a long way from an ISDN switch, you might be out of luck. Even if you can get the service, it's expensive.

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Circle 184 on reader service card

slow to make the ADSL lines available.

Some say the Baby Bells are protecting their lucrative market for T1 lines. A T1 line costs a company $250 to $1500 more per month than an ADSL line would. Others say the Baby Bells are just waiting until they themselves can offer ADSL access to the Web before they let competitors do it. But Jupiter's Ross Rubin says that the Baby Bells are just preoccupied.

"Their top priority is to protect their core market," he says. "Number two is to get more long-distance or regional customers. The only thing lower on their list of priorities than Net access is video delivery."

What can ISPs do in the meantime? In Oklahoma City, IoNet was using lines meant for burglar alarms to carry ADSL service. When Southwestern Bell caught wind of this practice, it shut it down.

A Southwestern Bell spokesperson says burglar alarm lines were never built to carry high-speed data. Dataquest's Bobbi Murphy agrees. "The faster you go, the harder the service is to employ," she says. "Higher frequencies mean more noise. Therefore, ADSL can interfere with ISDN and T1 lines." So while Baby Bells test lines to make sure ADSL won't botch their other services, you and I must wait.

WHAT DO YOU DO?

BE PATIENT. Experts agree that ADSL and other forms of digital subscriber lines will take off (see "You Will Have Faster Access"). But ADSL may land first only in business markets.

"ADSL will be highly localized," says Murphy. "Some companies are targeting it to businesses in 1998, but they will go for high-density markets." As we go to press, the only widely available commercial deployment of ADSL is in Phoenix. Several other areas, including Silicon Valley and Austin, Texas, are in a testing phase.

Satellite

Here Today–Really

THE SCOOP **GOOD NEWS:** You can buy a dish almost anywhere, and downloads are fast. **BAD NEWS:** You need a separate phone line and ISP for uploading, and installation can be hard.

WHEN PC WORLD'S own Michael Desmond escaped the big city to set up an office near Burlington, Vermont, he suspected that getting a fast Web connection could be a problem. After he moved, he found that he couldn't get an ISDN connection in his new home, as he'd hoped, so Desmond settled on a Hughes DirecPC satellite dish.

"I'm happy with the service," he says. "I can grab huge files without worrying about lost hours and broken connections."

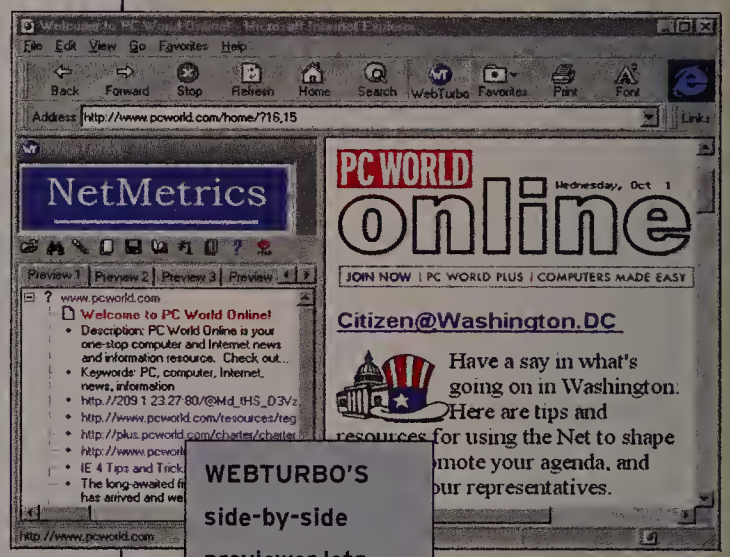
But setting up the dish can be a chore, especially if no DirecPC technicians are in your area. For Desmond, the trouble was in trying to find the satellite's signal. It took some doing, but with the help of a DirecTV technician (no DirecPC tech was available), Desmond realized he was pointing his dish at the wrong satellite. After an adjustment, he had everything working.

WHAT'S THE HOLDUP?

SATELLITE IS in fact widely available and has been for a while. It just hasn't been publicized. "I don't think most people realize that satellite Web access is available nationwide right now," says Paul ▶

Speed Surfing

(continued from page 212) that it has nothing you want. In return for watching ads (à la Pointcast), WebTurbo's (www.webturbo.com, free) side-by-side previewer lets you peek at a text summary of a Web page before you load it. WebTurbo installs as a button on either Netscape Navigator or Microsoft Internet Explorer. You can also create a tree view of your favorite sites, check out WebTurbo's Top Sites, or query as many as six search engines simultaneously.



WEBTURBO'S side-by-side previewer lets you peek at a text summary of a Web page before you load it.

● **Skip the Art.** Speed up browsing by reducing the amount of data downloaded. Turn off automatic image loading, disable Java, and say ciao to slow-loading applets. In Navigator 4.0 select *Edit•Preferences*, choose *Advanced*, and deselect these options: *Automatically load images*, *Enable Java*, and *Enable JavaScript*. In Internet Explorer 3.0 select *View•Options*, click the *General* tab, and deselect *Show pictures*, *Play sounds*, and *Play videos*. While you're in Options, click the *Security* tab, then deselect *Enable Java programs*. In IE 4.0 select *View•Internet Options*. Click the *Advanced* tab and deselect *Show pictures*, *Play animations*, *Play videos*, and *Play sounds*.

● **Excuse the Interruption.** Experts say interrupted downloads are the leading cause of swift kicks to PCs. If you download 90 percent of a file only to see your connection drop, don't start from scratch. Navigator 4.0 users can abort downloads and resume later, right where the download was lost. This is because it stores the partially downloaded file in its cache. Just click the original link *(continued)*

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Gaske, senior vice president at Hughes Network Systems. Most people are aware of DirecTV, though. That's why Hughes combined DirecPC and DirecTV to come up with DirecDuo. By linking the nascent DirecPC to its older, more popular sibling, Hughes is getting the word out: Come for the MTV, stay for the MTV Online.

Still, why does DirecPC remain little known? Gaske says his company had to iron out a few things before advertising it, such as writing a software program that would make it easier for satellite users to hook up to the service. Hughes also needed to ink more deals with outside companies to be sure of having enough technicians around the country.

WHAT DO YOU DO?

FIRST, MAKE SURE you can see lots of sky from your roof. If iron skyscrapers surround your quaint brownstone, or if your peaceful cabin is nestled among redwoods, you might be out of luck. Next, make sure that there's an installation technician where you live. Finally, check your bank account, because satellite connections aren't cheap: $300 to $400 for the hardware, plus another $200 to (hopefully) have someone install it. After that, you'll pay more than $100 a month for unlimited Web access. Depending on your location, those costs are comparable to ISDN's. But satellite is faster at downloading Web pages, and you can buy it nearly anywhere.

Even so, Net access by satellite remains an incomplete solution. You'll still need a good ISP and an old-fashioned phone line to upload data, because satellite dishes can only download information. When you upload data or make requests for Web pages, the signal has to go over a regular phone line to an ISP.

Here Today, Gone Tomorrow

THE SCOOP **GOOD NEWS:** It's more widely available than ever, and prices are coming down. **BAD NEWS:** It's still more expensive than cable, and much slower.

TOM O'TOOLE is a high-bandwidth poster child. But flying through Web pages isn't his primary reason for a high-speed connection. O'Toole, a freelance radio and TV announcer, records voice-overs at his home studio in Burr Ridge, Illinois, then shoots them to clients over his 128-kbps ISDN line.

"I needed high-speed, real-time, CD-quality audio transmission," O'Toole says. So last February, he called Ameritech, his local phone company, and ordered an ISDN line. "The future of my business is tied to a digital line because so many radio and TV studios are going digital. Now I can modem them the huge .wav files that I record in my studio."

But there are some caveats. "It's a touch on the expensive side," says O'Toole. "It costs me $62 a month for two B channels [64 kbps each], and that's before usage charges." O'Toole's home studio is also outside the range of existing ISDN switches. This means that the phone company had to install a line extender to make the ISDN reach O'Toole's studio—something that increases his bill by $22.50 a month. At press time, Ameritech had proposed a pricing change to eliminate the charge for line extenders.

"ISDN is not for the timid," O'Toole warns, noting that glitches have happened (his long-distance carrier once accidentally disrupted his connection). "It's not ▶

Speed Surfing

(continued from page 214) to restart the file transfer. This trick won't restart unfinished downloads in Internet Explorer, but you can get a utility called Jackhammer (Sausage Software, $25; www.sausage.com) to do so.

● **Cache In.** As you surf the Web, everything you see is stored on your hard disk in a cache, so you can flip through previously viewed pages faster. If you're constantly revisiting the same site—say, PC World Online (www.pcworld.com)—increase your disk cache to 10MB for extra speed (assuming you have the disk space). In Internet Explorer 3.*x* select *View•Options*, click *Advanced*, and then click the *Settings* button and specify the cache size. In Navigator 3.*x* select *Options*, click *Network Preferences*, then click the *Cache* tab and *Clear Memory Cache Now.*

● **Cache Out.** If you don't have the hard disk space to increase your cache, chances are it will fill up fast, draining resources and choking your browser. The solution: Purge the cache. In Internet Explorer 3.*x* select *View•Options*, click *Advanced* and the *Settings* button, then click *Empty Folder.* In Navigator 3.*x* select *Options•Network Preferences*, then click the *Cache* tab and *Clear Disk Cache Now.*

● **Cache Alternatives.** Think of it as digital STP oil. By replacing your browser's cache with a program like PeakSoft's $30 PeakJet (800/453-5322, www.peak-media.com), you may be able to increase browsing speeds. While you're busy reading online, PeakJet loads up links it *thinks* you'll click on next. It works best on muscled-up PCs—100 MHz and at least 32MB of RAM (more is much better). Results vary; you can try PeakJet for 30 days at no charge.

● **Defrag Your Drive.** To make sure that your disk cache is healthy and loading at top speed, you should regularly defragment your hard disk; this consolidates data that has become spread out across the drive. (In Windows 95 select *Start•Programs•Accessories•System Tools•Disk Defragmenter.*) To get the best performance from your cache and speedier hard drive performance in general, try defragging every few weeks.

● **Learn Your Lines.** If your modem consistently connects at slower-than-rated speeds, ask your local phone company to *(continued)*

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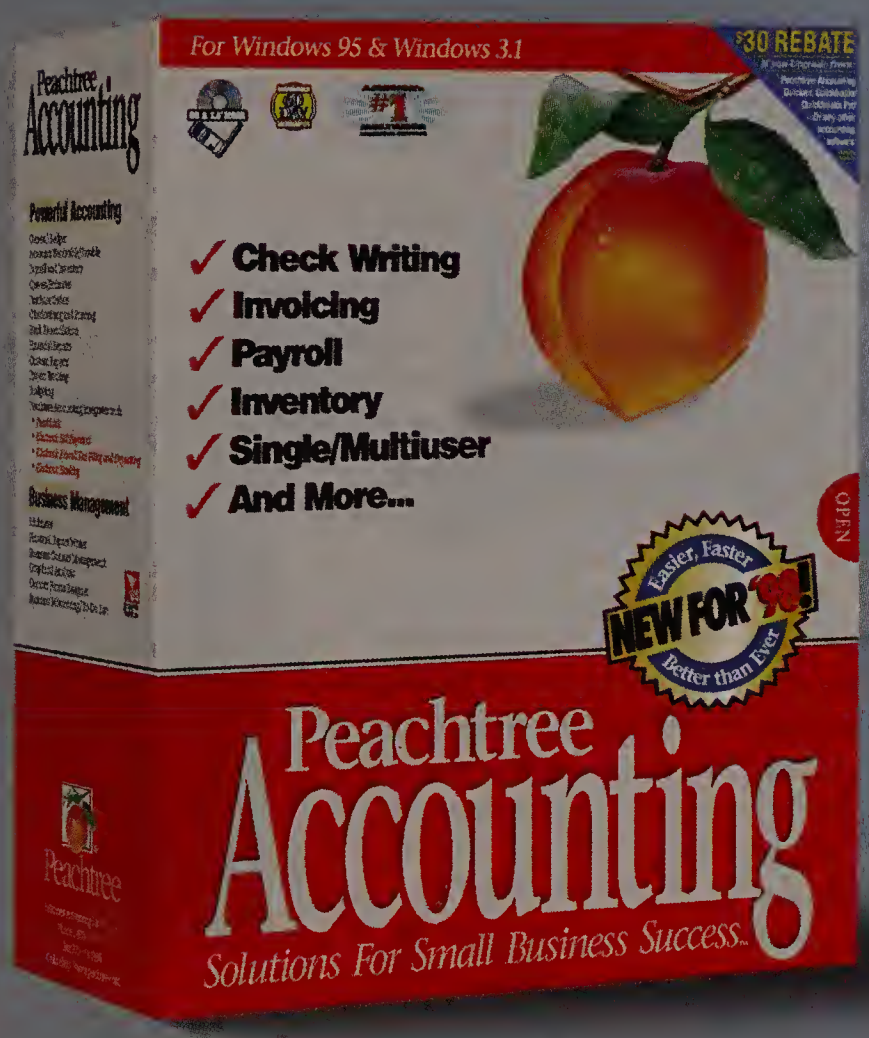

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Circle 175 on reader service card

as simple as installing the line and running a setup program. But once it's up and running, it is awesome."

WHAT'S THE PROBLEM?

WHEN ISDN stumbled out of the gate, there were horror stories about installation gaffes, home users being charged business rates, nonexistent customer service, and poorly trained technicians. In addition, phone companies had to upgrade their networks to provide ISDN—this at a time when T1 lines were doing good business and didn't require upgrading. As a result, phone companies didn't put a lot of resources into ISDN.

"ISDN never really caught on because it was never marketed well and it was expensive to deploy and use," says analyst Ross Rubin.

Times have changed, however. Today, prices are dropping and phone companies have had practice installing the lines. But mind you, there are still many parts of the country that ISDN doesn't reach.

So do you want ISDN? For a high-speed connection right now, it's your best choice—unless your cable company is selling Net access. But ISDN may already be past its prime. The basic service performs at 64 kbps, which isn't much better than the fastest (and far cheaper) analog modems. And the 128 kbps of full-fledged ISDN pales next to the speeds of some of the other options now becoming available.

"We see ISDN continuing to grow until the year 2000—mostly for niche applications and corporate LAN access—but then ADSL will force it down," says Rubin.

WHAT DO YOU DO?

IF YOU HAVE the need and the funds (and no other options are available in your area), ask your phone company whether you can get ISDN. Just remember that the service isn't cheap. Monthly charges can range from $50 to $300 and up, depending on where you live and what pricing plan you choose.

You also need to research which ISDN adapter to buy. These devices can cost anywhere from $100 to $400. (See "Bandwidth on Demand," August 1997, for more on ISDN adapters.)

SO...WHEN WILL IT ALL HAPPEN?

NO ONE CAN put a date on *when* we will all be able to get fast access to the Web. But most people agree that it *will* happen. "We want to get where there is always high-speed access for everybody. You won't have to worry about dialing up; it will just always be there," says Pierre de Vries, director of advanced projects in the Consumer Platforms division at Microsoft. That's why the company injected $1 billion into Comcast, spent $425 million on WebTV, is partnering with phone companies to launch ADSL trials, and is working with modem manufacturers to get ADSL modems built.

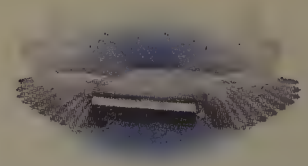
> No one can say **when** we will all have **faster access,** but most people agree that it **will happen.**

In addition, Microsoft is investigating technologies that would exploit the unused bandwidth in television broadcasts, as well as the use of satellites, to deliver data along with your usual TV programming. The company isn't betting on any single technology to deliver the invisible high-speed access that de Vries envisions. "Our role is to be sure we can accept data through whatever means the customer chooses," he says.

De Vries points out that this is all a long-term investment for Microsoft. "People always predict too much for the short term," he explained, "and too little for the long term." So we'll obviously have to wait for it. But when we do get high-speed access, maybe it will be more like flipping on the TV than logging on to a PC.

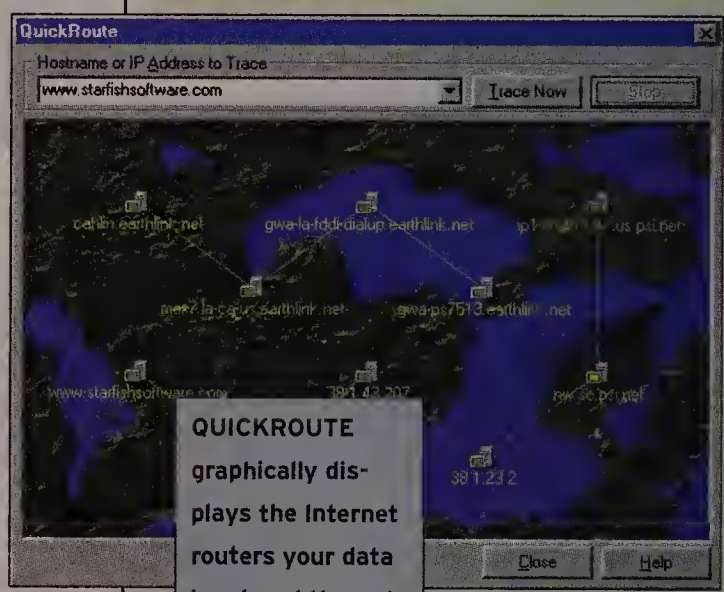
online *Find files from this article at PC World Online at www.fileworld.com. Brad Grimes is a senior associate editor for* PC World. *Michael Cahlin is a freelance writer based in Los Angeles.* ■

Speed Surfing



(continued from page 216) check outside lines and inside wiring. Noisy lines hurt connection speeds. Next step: Call your ISP and make sure you're dialing in on the right line.

● **Point Fingers.** If you want to find out exactly who's responsible for your World Wide Wait, PY Software's $19 Any Speed (www.kagi.com/yellow), VitalSigns Software's $30 Net.Medic (888/984-8259, www.vitalsigns.com), and Starfish's QuickRoute feature in its $30 Internet Utilities 97 (888/782-7347, www.starfish.com) all monitor bandwidth performance. Any Speed checks the Net and tells you when connection speeds are the fastest. Net.Medic's Health Log diagnosis and AutoFix capabilities tweak internal system settings and even send e-mail to ISPs and the Webmasters of slow sites. QuickRoute graphically displays the Internet routers your data relays through to reach a targeted site.



QUICKROUTE graphically displays the Internet routers your data is relayed through before getting to the targeted site.

● **Point Fingers for Free.** You can get the same kind of information about bandwidth bottlenecks with a DOS utility in Windows 95. While connected to the Web, go to the MS-DOS prompt, type **TRACERT**, type the URL of the site you want to connect to, then press *Enter.* You'll get a text readout of your "data hops" including response time, site name, and ISP address.

● **Know When to Say No.** Sometimes the fastest way to break the bandwidth clutter is not to fight it. The day (or week) that Microsoft releases a new browser is not the best time to attempt downloading it. Instead, avoid the Web rush and do something nice for yourself in the real world. —Michael Cahlin ■

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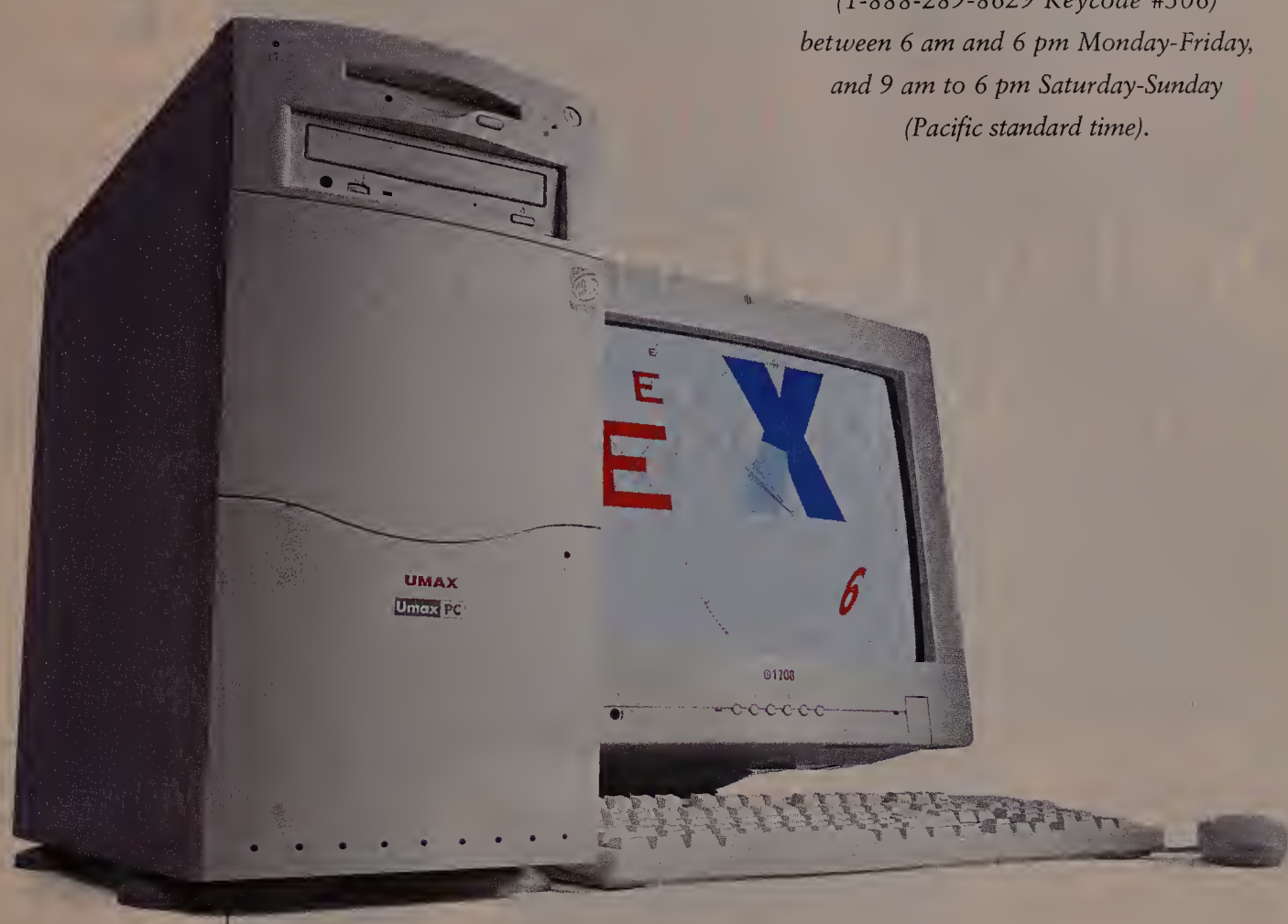

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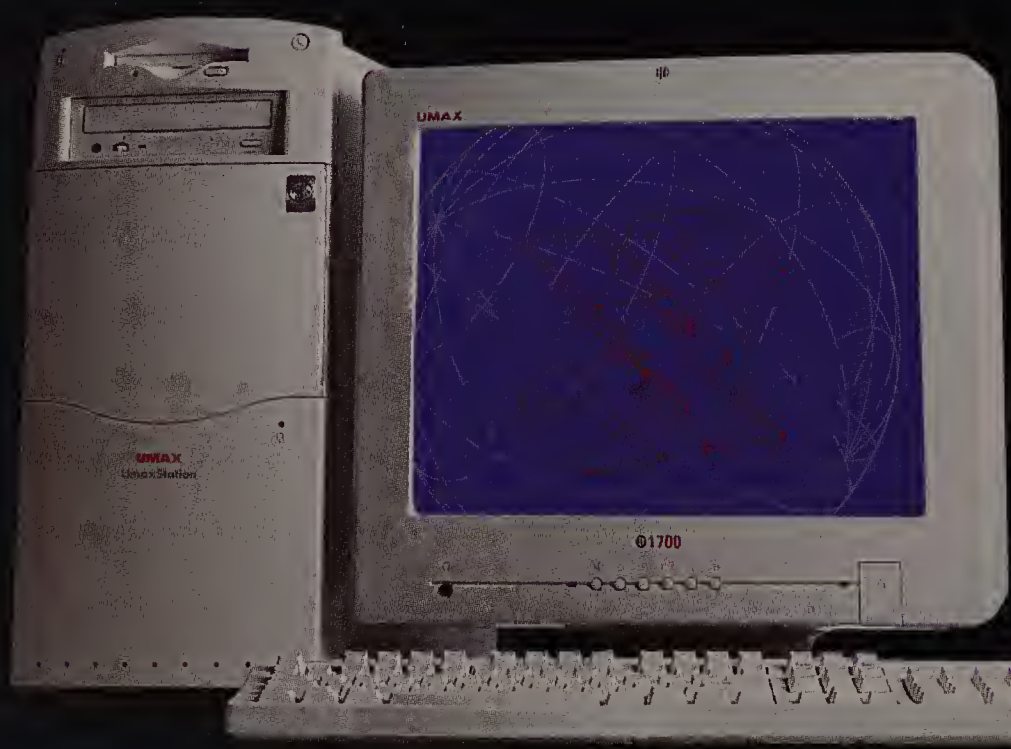

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- 17" Flat Square Color Monitor
- ASUS, V3000, AGP 4MB Video Card
- 24X Max Variable CD-ROM Drive
- Creative Labs AWE64 Value Sound Card
- Iomega 100MB Zip Drive
- Yamaha Stereo Speakers with Subwoofer
- 56K Capable US Robotics X2 Internal Data/Fax Modem
- Microsoft Windows 95
- Lotus SmartSuite, Adobe PageMill, and Adobe PhotoDeluxe
- Microsoft IntelliMouse
- PS/2 Keyboard

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- Creative Labs AWE64 Value Sound Card
- Yamaha Stereo Speakers with Subwoofer
- 56K Capable US Robotics X2 Internal Modem
- Microsoft Windows 95
- Lotus SmartSuite, Adobe Pagemaker® 6.5, Adobe Photoshop® 4.0, Adobe Illustrator® 7.0, Adobe PageMill, and Adobe PhotoDeluxe
- Microsoft IntelliMouse
- PS/2 Keyboard

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- Creative Labs AWE64 Value Sound Card
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- 56K Capable US Robotics X2 Internal Modem
- Microsoft Windows NT® 4.0
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- ELSA Gloria-L Video Card
- 4x/6x Yamaha Recordable CD-ROM
- Iomega Jaz Drive
- Iomega Ditto™ 3200 Tape Drive
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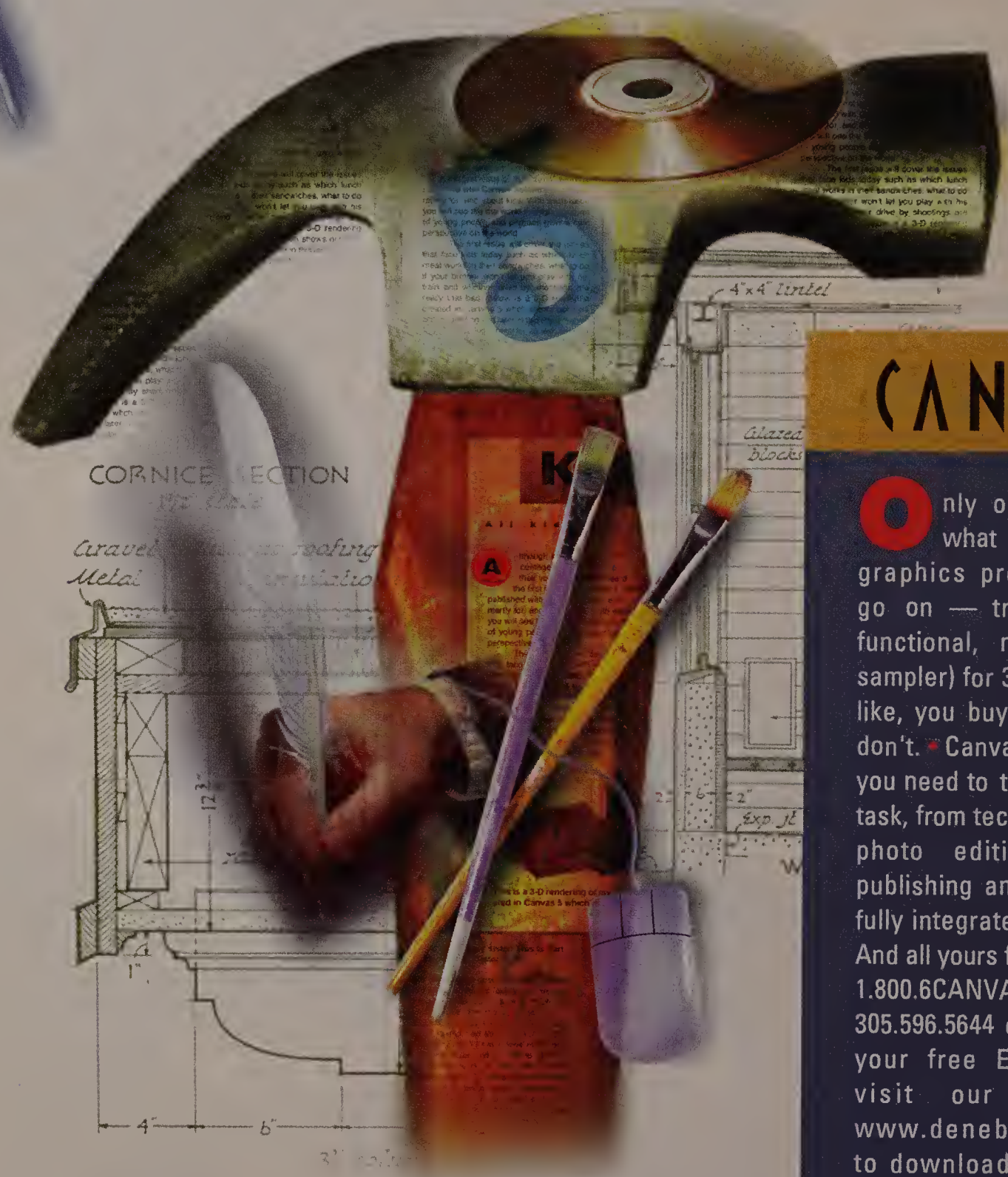

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TOP 100

228 Power Desktops

240 Budget Desktops

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256 Home PCs

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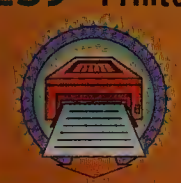


263 Monitors

265 Graphics Boards

267 Modems

Intel PCs GET Cheaper

UNEASY LIES THE HEAD that wears the crown. Intel, the reigning monarch of PC processors, must be feeling anxious as CPUs from rivals Advanced Micro Devices and Cyrix invade the budget desktops market. This month Intel responds with a round of ▶

EDITED BY REX FARRANCE

GATEWAY'S E-3110 PII-266: Corporate powerhouse costs a whopping $540 less this month.

MICRON'S Transport XKE: Desktop ready with port replicator, external speakers.

sharp price reductions on its own CPUs—especially the Pentium II processors.

As a result, close to half of the Intel-based systems on this month's Top 20 PC charts have dropped substantially in price. Of the 20 PCs on our power chart, for example, eight systems—all of them Pentium IIs—have had their prices slashed by $200 or more. A similar number of Intel-based models on our budget desktops chart are down by $100 or more. The biggest price cut of all this month? Gateway's E-3110 PII-266, a corporate Pentium II-266—which comes complete with a network adapter and LAN management software—does a breathtaking $540 swan dive to $2349. The reduction boosts the E-3110 six places higher on the power chart.

AMD HEADED OFF AT THE PASS

ON THE POWER CHART, price cuts averaging $170 helped most of January's Best Buys hang on to their positions for another month. Dell's Dimension XPS D266, now $180 cheaper at $2649, is still number one. On the budget list, however, steadily falling prices on Pentium MMX–based PCs halted last month's upward surge by AMD-based contenders. Micro Express's MicroFlex P225J and CyberMax's PowerMax, formerly in second and third place, fall to fourth and fifth, while Gateway's GP5-233, a PMMX-233 that's $119 cheaper than last month, and Quantex's QP5/200 SM-1 (down $200) take over in first and second position.

But five of the seven PCs under $1500 still use an AMD or Cyrix CPU. The cheapest of these is Kingdom's $1197 Pinnacle PV-200+, a Cyrix-based PC in 18th position. The least costly Intel-based PC is AST's Bravo MS 5166, a $1430 MMX-166 first tested in August that returns this month $269 cheaper.

MAKE WAY FOR GATEWAY

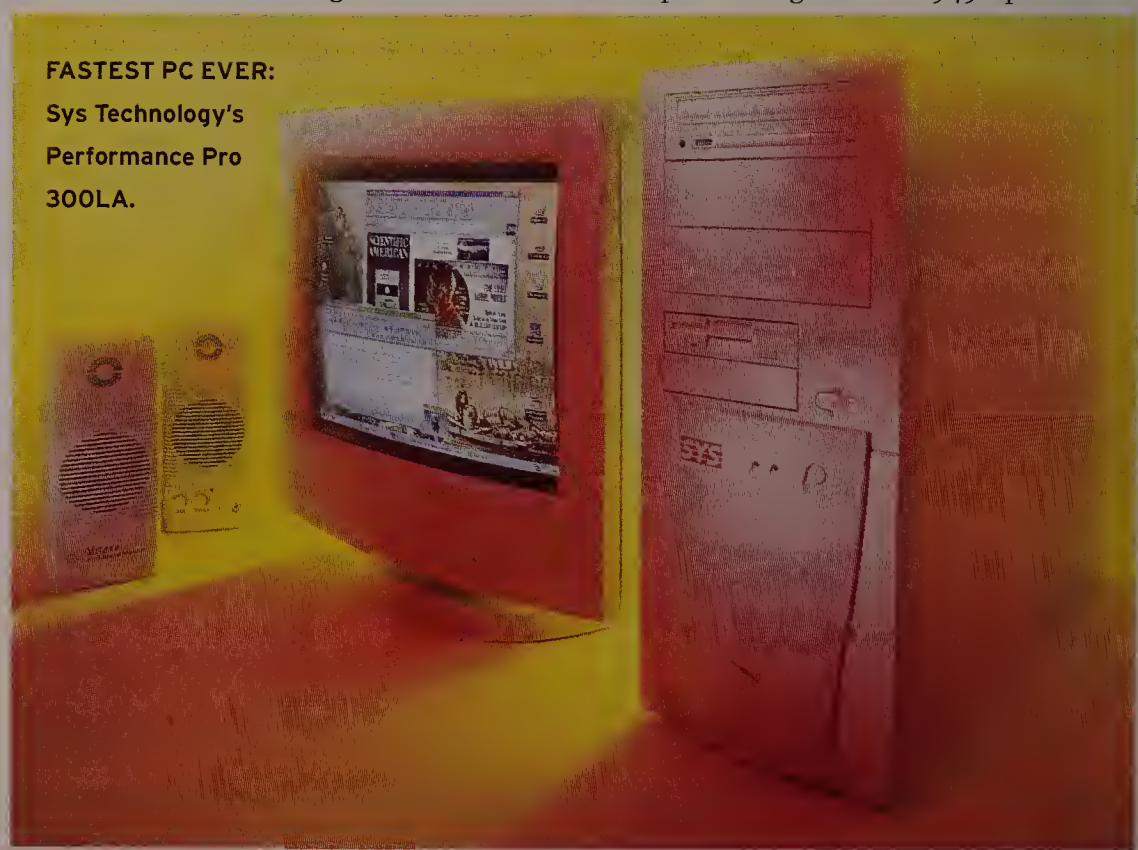
SEVEN NEW desktops make our lists for the first time this month, three of them from Gateway 2000. We found Gateway's new Pentium II-266 G6-266 a better power desktop value than the 300-MHz G6-300XL that had been a Best Buy since November. At $2999, the G6-266 is $700 cheaper and only 3 percent slower than the G6-300XL. The G6-300XL offers an extra edge of performance and a host of game software and hardware, but for a lot less, the G6-266 comes with the same top graphics and sound equipment and the same clean, attractive design.

Two new Gateway 2000 PII-233s appear on our budget list. The G6-233 is the first Pentium II costing less than $2000 to make our chart. It's a great price for a very fast system whose most basic component is a 2GB hard drive—comparatively small for a new system these days, but still adequate. Gateway's E-Series E3110 lands in seventh place, right behind the G6-233. A PII-233 system with a corporate bent, it adds a network adapter and management software that allow administrators to inventory and upgrade applications remotely. And it still comes in under $2100.

The remainder of this month's new PCs are mostly Pentium IIs. Sys Technology's $3210 Performance Pro 300LA, a PII-300 that lands in 11th place on the power chart, is the fastest PC we've ever tested. With a PC WorldBench score of 277, it's almost three times as fast as the typical Pentium-75. The only new PC on this month's charts that isn't based on an Intel chip is Innovative HV's $1645 DT K6/200, which uses AMD's K6-200 CPU. Several hundred dollars cheaper than most PII-233s and almost as fast, the K6/200 couldn't manage any higher than 14th place on our budget chart because of the company's short support hours.

MOBILE MULTIMEDIA

THIS MONTH WE REVIEW a new mobile PC from Micron that earns a number two ranking on our power notebooks chart, despite its high-ticket $5438 price. The



FASTEST PC EVER: Sys Technology's Performance Pro 300LA.

Micron Transport XKE 233 gives new meaning to the term *multimedia notebook*. This Pentium MMX-233 system runs neck and neck with the fastest mobile computer we've ever tested, the Gateway 2000 Solo 2300XL. But this machine has a lot more going for it than speed: It's simply the best multimedia portable we've seen—with a host of high-end audio and video features. For example, you don't even have to turn the notebook on to listen to audio CDs—just insert the disc and it plays, either through the Transport's small built-in speakers or through the larger and better-sounding speakers connected to the optional port replicator. And when you have to cut the cord, the great battery will keep you running—it lasted an impressive 8-plus hours in our tests.

A new low-cost version of the Pentium II will appear this summer in sub-$1000 PCs.

PENTIUM II LITE?

SLASHING PRICES on existing CPUs apparently isn't all Intel has planned to stem erosion in its market position. The company will be releasing a stream of new products in months to come, including a mobile PMMX-266 CPU. This chip will compete with AMD's K6, which will also be appearing shortly in notebook PCs.

The Pentium II-300 will soon lose its status as Intel's top gun: Systems with Pentium II-333 processors—using the same 66-MHz system bus as current Pentium IIs—will be out by late winter. This processor is the first of a new PII family, code-named Deschutes; these chips will all be manufactured with a reduced circuit size of .25 microns to lower power consumption and heat output. The Pentium II-333 will be followed this spring by 350- and 400-MHz Deschutes-based systems that will run on a faster 100-MHz system bus.

To keep budget customers happy, Intel promises midyear delivery of a new lower-cost Deschutes version of its PII CPU without a secondary cache. You can expect this processor to appear sometime this summer in PCs priced below $1000. Intel also plans to release a higher-end Deschutes CPU with a secondary cache integrated on the chip—à la Pentium Pro—which will appear later in the year.

Meanwhile, expect some major vendors to move from Pentium MMX lineups to all Pentium II systems right away. Dell, for example, will discontinue its budget desktop Best Buy Dimension M200a by next month and provide a low-cost Pentium II-266 PC as its prime budget offering. Look for a review of the new budget version of Dell's Dimension XPS D266 next month.

Rex Farrance is a senior associate editor for PC World. *Assistant Editors Grace Aquino and Mick Lockey; Associate Editors Vince Bielski, Andrew Brandt, JoAnne Robb, and Karen Silver; and freelance writers Jon Jacobi, Alex Jorge, and Dan Littman contributed to the Top 100. Testing for the Top 100 by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, and Mike Salayko.* ▶

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them. If not, ask us; see page 14 for contact information.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. The Top 20 charts are divided by price. Power desktops cost $2250 or more; power notebooks cost $2750 or more. Every month we test the latest products in each category and compare them to the pool of items we've already reviewed. As new products earn places on the charts, those at the bottom drop off. Price cuts also cause chart changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? It's the sum of all our tests—both hands-on evaluations and automated speed tests. The scale is 1 to 100, so a product that scores in the 90s is generally considered exceptional, one in the 80s is among the best, one in the 70s is above average, and one that scores lower usually doesn't place.

What does the PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Dell P75t configured with 8MB of RAM, a 540MB hard drive, and no secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline unit.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores come from readers responding to Reliability and Service surveys. The policies score is based on vendor support policies (such as length of warranty for parts and labor, weekday toll-free support hours, and availability of weekend and online support).

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For example, a budget PC that is rated "expensive" is high priced only in relation to other budget PCs. Likewise, a power notebook rated "good" for performance is good only in relation to other power notebooks. Word scores for other categories, such as features, are relative to all desktops or all notebooks.

Where can I find the online version of the Top 100? Go to PC World Online (www.pcworld.com). There you'll find not only the current issue of *PC World* and reviews from back issues, but some extra features, including reviews not available in print. You can read full reviews of Top 10 products, for instance, by going directly to the URL provided in each Top 100 section.

Ever wish you could build a chart based on your own buying criteria? You can, with Buyer's Guide, our Web site's chart customizer (www.pcworld.com/hardware/t2010). Buyer's Guide combines your criteria with current *PC World* data and test results to generate customized Top 20s and Top 10s. For instance, if you want your chart to rank notebooks that have 120-MHz CPUs and 1.6GB hard drives, the guide's Personal Adviser will find and rank all machines that fit your specifications.

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (11/17/97)	CPU	Comments
1	Dell Dimension XPS D266 800/388-8542 www.dell.com	1	Nov 97	$2649	Pentium II-266	$180 price drop keeps fast system with AGP graphics on top. D300 also good.
2	Dell OptiPlex GXa266 800/388-8542 www.dell.com	2	Nov 97	$2767	Pentium II-266	$121 drop, great design, ethernet, AGP, fine reliability and support; no modem.
3	Gateway 2000 G6-266 800/846-2000 www.gateway.com	–	NEW	$2999	Pentium II-266	Quick, big monitor, ethernet, AGP graphics. Pricier 300XL also good.
4	Quantex QP6/300 SM-3x 800/896-4898 www.quantex.com	5	Dec 97	$2799	Pentium II-300	$200 drop makes PII-300 more affordable, AGP graphics, top support policies.
5	Micron Millennia XKU 300 888/634-8799 www.micronpc.com	4	Nov 97	$3619	Pentium II-300	$170 price drop, very fast, great 19-inch monitor, AGP. PII-266 also good.
6	Unicent Avanta L266 800/308-3614 www.unicent.com	–	Oct 97	$2399	Pentium II-266	Big $500 drop puts speedy small-office PC on chart. Pricier L300 also good.
7	Gateway 2000 E-3100 PII-266 800/846-2000 www.gateway.com	13	Dec 97	$2349	Pentium II-266	$540 drop on corporate PC, ethernet, no sound or modem. PII-300 also good.
8	DirectWave MVP VX2-300 800/882-8108 www.directwave.com	7	Jan 98	$2799	Pentium II-300	$200 price drop on superfast, well-configured tower. Terrific support policies.
9	Sys Technology Performance 233M2 800/613-9963 www.systechnology.com	8	Jan 98	$2719	Cx6x86MX-PR233	Fast Cyrix-based corporate system, terrific features; skimpy online support.
10	Kingdom Pinnacle 266/S 800/385-3436 www.kingdomcomputers.com	–	NEW	$2597	Pentium II-266	Fine price on well-configured SOHO PC with generic modem and CD-ROM drive.
11	Sys Technology Performance Pro 300LA 800/613-9963 www.systechnology.com	–	NEW	$3210	Pentium II-300	Fastest PC we've tested has top-notch components but skimpy online support.
12	Sys Technology Performance 233K6 800/613-9963 www.systechnology.com	12	Nov 97	$2702	AMD K6-233	Well designed and configured; speed is only so-so and support policies uneven.
13	HP Brio 233 MMX 800/724-6631 www.hp.com	14	Jan 98	$2343	Pentium MMX-233	Well-built small-business PC, good on-screen help, custom keyboard.
14	Acma EXP Pro PII 266 800/786-6888 www.acma.com	–	Dec 97	$2399	Pentium II-266	Huge $500 price cut puts well-configured PC on chart; no apps, limited support.
15	IBM PC 300XL PII-266 800/426-2968 www.ibm.com	18	Nov 97	$3487	Pentium II-266	$298 drop on quick corporate PC; fine design, locking cover, management app.
16	DFI Landmarq XFX M500 800/808-4334 www.dfiusa.com	–	NEW	$2699	Pentium II-266	Well designed, great features except for so-so monitor, poor support policies.
17	DTK Quin-57M/PM233 800/289-2385 www.dtkcomputer.com	16	Oct 97	$2361	Pentium MMX-233	Full-featured PC has fast modem, but support policies need improvement.
18	Netis Starburst 266 800/577-7526 www.netistech.com	17	Dec 97	$2290	Pentium II-266	$100 drop on no-frills PII-266. Few bells and whistles but covers the basics.
19	Everex StepStation2 800/383-7391 www.everex.com	–	Dec 97	$2550	Pentium II-266	$500 price drop puts fast PC back on chart; no speakers.
20	Amax GFX Pro 266 800/800-6328 www.amax.com	–	Dec 97	$2649	Pentium II-266	$245 drop brings back PII-266 with Zip drive, thin support.

Best Buy See features chart, page 230; test report, page 232.

[1] For more information about all products in this table, circle reader service no. 901. [2] Insufficient data to give a rating.

STEEPLY DISCOUNTED PCs pepper our chart this month—in fact, more than a third of our power systems are down $200 or more. Acma's EXP Pro, Everex's StepStation2, and Unicent's Avanta come down $500 each, and Gateway 2000's E-3100 corporate PC drops a hefty $540. Gateway's G6-266 takes over third place as a more affordable alternative to last month's number three Best Buy, the Gateway G6-300XL. Also new to the chart are Pentium II systems from DFI, Kingdom, and Sys Technology. We reviewed other new PCs from HP, Intergraph, and Vektron, but they didn't rank high enough to claim places on the chart. For more on these machines, visit PC World Online (www.pcworld.com/t20pcs).

SCORECARD

★ Overall rating	PC WorldBench score/performance	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	Reader service number[1]
91	264/outstanding	outstanding	above average	inexpensive	above average/best	601
90	259/very good	outstanding	above average	average	above average/best	602
87	263/very good	outstanding	average	average	above average/best	603
85	269/outstanding	very good	average	average	average/best	604
85	270/outstanding	very good	above average	very expensive	above average/best	605
84	264/outstanding	very good	[2]	very inexpensive	[2]/best	606
83	262/very good	satisfactory	average	very inexpensive	above average/best	607
83	272/outstanding	good	[2]	average	[2]/best	608
82	259/very good	outstanding	[2]	average	[2]/good	609
82	264/outstanding	very good	[2]	inexpensive	[2]/good	610
82	277/outstanding	outstanding	[2]	expensive	[2]/good	611
81	251/good	outstanding	[2]	inexpensive	[2]/good	612
80	239/good	very good	average	very inexpensive	average/fair	613
80	258/very good	very good	[2]	very inexpensive	[2]/fair	614
80	264/outstanding	very good	average	expensive	average/good	–
79	263/very good	outstanding	[2]	inexpensive	[2]/poor	615
79	241/good	outstanding	[2]	very inexpensive	[2]/poor	616
79	257/very good	good	[2]	very inexpensive	[2]/fair	617
79	257/very good	good	[2]	inexpensive	[2]/best	618
77	258/very good	good	[2]	inexpensive	[2]/poor	619
Scorecard weightings ▶	Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

This Month's Best Buys

1 DELL DIMENSION XPS D266

PRO: Quick, fine design, most surveyed readers are happy with Dell's service and system reliability

CON: Speakers a little bass-heavy

For the most part, the D266—which is down another $180 this month to $2649—is a top-drawer PC. This high-end small- and home-office system comes with 64MB of SDRAM, an 8.4GB hard drive, a 12X–24X CD-ROM drive, and an internal 56-kbps Sportster modem with x2 technology. Even the Sound Blaster AWE64 sound board is top of the line, with its hardware wavetable and full-duplex capabilities.

The D266 uses Intel's advanced 440LX chip set with support for Accelerated Graphics Port, the latest in high-performance graphics bus technology. The AGP systems we've tested, which include the DirectWave, Micron, Quantex, and Sys Technologies Pentium II-300s on this month's chart, are great performers but don't run business applications noticeably faster than similarly configured systems with PCI graphics. Nonetheless, more and more vendors are adopting AGP as the next step in high-speed graphics—and at minimum, it frees a PCI slot for use by another expansion device you may want to install. We weren't overly impressed with Dell's economy-model 1000LS 17-inch monitor, although it is a big improvement over the 1000LS model it replaces. The Altec Lansing ACS 290 subwoofer-equipped speakers sounded bass-heavy and a bit muddy, no matter how we tweaked them. Audio aficionados will want to spend $49 more to get Dell's top speaker offering, the ACS 490.

Dell Dimension XPS D266

Even with its wealth of peripherals, the D266 has four empty drive bays and four free expansion slots. To top it all off, the system comes with Microsoft Office 97 Small Business Edition. Dell's support policies are among the best, including a three-year warranty on parts, one-year coverage on labor, around-the-clock toll-free support, and free on-site service for the first year. Judging by reader feedback, Dell's support quality and the reliability of its PCs are both above average.

2 DELL OPTIPLEX GXA266

PRO: Great design, Trinitron monitor, built-in ethernet, highly expandable, above-average reliability and support reputation

CON: No modem, skimpy software bundle

Dell's OptiPlex systems are aimed at networked corporate environments, where sensible design matters more than the very latest in technology. The $2767 OptiPlex, down $121 from last month, generally holds to that course—except for providing integrated AGP graphics. Service professionals will appreciate having superconvenient ▶

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension XPS D266*	Pentium II-266	64	512	8.4	ST8 Velocity 128 3D AGP	4/SGRAM	17/15.9	.28	12X-24X
2	Dell OptiPlex GXa266*	Pentium II-266	32	512	3.2	integrated ATI 3D Rage Pro AGP	4/SGRAM	17/15.8	.26	12X-24X
3	Gateway 2000 G6-266*	Pentium II-266	64	512	6.4	STB Velocity 128 3D AGP	4/SGRAM	19/18	.26	12X-24X
4	Quantex QP6/300 SM-3x*	Pentium II-300	64	512	6.4	Diamond Viper V330	4/EDO DRAM	17/16	.28	12X-24X
5	Micron Millennia XKU 300*	Pentium II-300	64	512	6.4	Diamond Viper V330	4/SGRAM	19/18	.22	12X-24X
6	Unicent Avanta L266	Pentium II-266	64	512	4.3	Matrox Millennium II	8/WRAM	17/15.8	.28	12X-24X
7	Gateway 2000 E-3100 PII-266	Pentium II-266	64	512	4	ATI 3D Rage II+	8/SGRAM	17/15.9	.26	12X
8	DirectWave MVP VX2-300	Pentium II-300	64	512	7	Matrox Millennium II AGP	4/WRAM	17/16.1	.26	12X-24X
9	Sys Technology Performance 233M2	Cx6x86MX-PR233	32	512	6.4	Number Nine Revolution 3D	8/WRAM	17/15.9	.26	12X-24X
10	Kingdom Pinnacle 266/S	Pentium II-266	64	512	4.3	Hercules Terminator 3D	4/EDO DRAM	17/15.8	.26	12X-24X
11	Sys Technology Performance Pro 300LA	Pentium II-300	64	512	6.4	Number Nine Revolution 3D	8/WRAM	17/15.9	.26	12X-24X
12	Sys Technology Performance 233K6	AMD K6-233	32	512	6.4	Number Nine Revolution 3D	8/WRAM	17/15.9	.26	12X-24X
13	HP Brio 233 MMX	Pentium MMX-233	32	512	6.2	Matrox Millennium II	4/WRAM	15/13.7	.28	12X-24X
14	Acma EXP Pro PII 266	Pentium II-266	32	512	3.2	STB Nitro 3D	4/DRAM	17/16.1	.26	12X-16X
15	IBM PC 300XL PII-266	Pentium II-266	32	512	4.1	Matrox Millennium II	4/WRAM	17/15.7	.28	12X-16X
16	DFI Landmarq XFX M500	Pentium II-266	64	512	6.4	Matrox Millennium II	4/WRAM	17/15.7	.28	12X-24X
17	DTK Quin-57M/PM233	Pentium MMX-233	64	512	2.1	Diamond Stealth 3D 3000	4/VRAM	17/15.8	.28	12X-16X
18	Netis Starburst 266	Pentium II-266	32	512	3.1	Matrox Millennium II	4/WRAM	17/16.1	.25	12X
19	Everex StepStation2	Pentium II-266	32	512	3.1	Matrox Millennium II	4/WRAM	17/16.1	.28	12X-24X
20	Amax GFX Pro 266	Pentium II-266	32	512	3.2	Matrox Millennium II	4/WRAM	17/15.9	.25	12X-24X

* Best Buy
[1] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.
[2] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[3] Six years on CPU and main RAM, one to five years on other parts.
[4] After one year, support drops to 9 hours on weekdays only, not toll-free.

access to the system's interior. And Dell says it puts all new OptiPlex PCs through an exhaustive battery of network compatibility tests. In addition, Dell's corporate desktops include DMI 2.0 client management software, designed to make it easy for IS administrators to inventory network changes and perform software upgrades from the comfort of a central office. Fortunately, the system's PC WorldBench score of 259—average for a Pentium II-266—means you don't have to sacrifice performance to get its button-down stability.

Dell OptiPlex GXa266

This corporate desktop delivers a lot of features for the price. It comes with a roomy midtower case and a good-looking 17-inch Dell Trinitron monitor, as well as a very comfortable keyboard. Other features include an integrated ethernet adapter, and good multimedia in the form of Altec Lansing ACS 290 speakers that deliver a strong but somewhat muddy bass. Software and modem, however, cost extra.

One of the coolest things about the GXa266 is its clever internal design. To get to the seven free slots, just remove the case and lift a lever: The entire circuit board holding the slots slides out.

Like other OptiPlex models, this PC is backed by a fine set of standard support policies, including a three-year parts warranty, one-year coverage on labor, 24-hour support, and a year of free on-site service. According to our readers, the quality of Dell's support and the reliability of its desktop PCs are both above average.

3 GATEWAY 2000 G6-266

PRO: Very good performance, high-quality components, big monitor, network adapter

CON: Curved top of midtower case makes it hard to stack external components

This month the $2999 Gateway 2000 G6-266 takes over the spot formerly held by the company's G6-300XL. The G6-266 is nearly as well configured as the G6-300XL, almost as fast, and costs $800 less.

The G6-266 achieves that saving by omitting all the entertainment software and game-specific hardware that comes

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (KB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
56 [1]	Sound Blaster AWE64	midtower	384	512	2	3/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
–	integrated Crystal PnP Audio	midtower	384	512	2	2/1	7	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
56 [1]	Ensoniq Audio PCI ES1370	midtower	384	512	2	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
56 [2]	integrated	midtower	192	512	1	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
56 [1]	Sound Blaster AWE64	midtower	384	512	1	2/0	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
56 [1]	integrated	midtower	256	512	2	2/1	4	5/3	24	Sat., Sun.	BBS, WWW
–	–	midtower	256	512	1	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
56 [2]	Sound Blaster AWE64	tower	384	512	1	4/1	4	3/3	24	Sat., Sun.	BBS, WWW
56 [1]	Sound Blaster 32 PnP CT3600	midtower	256	512	5	3/2	3	varies [3]/5	24 [4]	Sat., Sun.[4]	WWW
56 [2]	Ensoniq Wavetable 3D	midtower	512	512	2	2/3	2	3/1	15.5	Sat.	WWW
56 [1]	Sound Blaster AWE64	midtower	512	512	2	3/2	4	varies [3]/5	24 [4]	Sat., Sun.[4]	WWW
56 [1]	Sound Blaster AWE64	midtower	512	512	5	3/2	3	varies [3]/5	24 [4]	Sat., Sun.[4]	WWW
56 [1]	OEM AzTech 100B PnP Audio	midtower	256	512	4	2/2	3	3/3	16	Sat.	AOL, CIS, WWW
56 [1]	Sound Blaster AWE64	midtower	128	512	2	0/1	2	3/1	9.5	–	BBS, WWW
–	Crystal PnP Audio System	desktop	384	512	2	1/1	2	3/1	24 [5]	Sat., Sun.	AOL, BBS, CIS, WWW
56 [1]	Sound Blaster AWE64	midtower	512	512	2	3/2	3	2/lifetime	10	–	BBS, WWW
56 [1]	Sound Blaster AWE64	midtower	256	512	4	3/2	4	2/2	9	–	BBS, WWW
33.6	OEM	midtower	256	512	2	1/1	4	1/3	10	Sat.	BBS, WWW
56 [1]	Sound Blaster 32 IDE PnP	midtower	768	512	4	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, WWW
56 [1]	Sound Blaster AWE32	midtower	512	512	6	2/0	3	3/1	9	–	BBS, WWW

[5] IBM charges for support after three years.

with the 300XL, and by using a Pentium II-266 CPU rather than a PII-300. But its performance is still within 3 percent of the 300XL's. The G6-266 matches the 300XL's 64MB of SDRAM but substitutes a 6.4GB hard drive for the 300XL's 8.4GB unit. (If you want the extra capacity, you can get the 8.4GB model for $56 more.)

Like its pricier sibling, this system comes with a good-looking 19-inch EV900 monitor—a nice step up from a 17-inch display; it will allow you to work at a higher resolution without shrinking text to an unreadable size. You'll be able to see a lot more on screen and get smoother graphics. To drive the big display, Gateway uses one of the better AGP graphics adapters available, STB's Velocity 128 3D AGP video card with the Invidia chip and 4MB of SGRAM. And to make it easy for you to hook up to the network, the PC also includes a 3Com PCI 10/100 twisted-pair ethernet adapter. To handle communications, you get Gateway's 56-kbps TelePath Modem for Windows with x2 technology and a speakerphone. An Ensoniq wavetable card and a pair of Boston Acoustic satellite speakers, along with a bassy subwoofer, provide you with terrific sound.

Gateway 2000 G6-266

You'll find loads of nifty design touches on this system. The sides and top of the light-gray case curve subtly outward in nice contrast to most vendors' square, putty-colored boxes. The only problem with the curvy top: You lose a handy place to stack external peripherals, such as a Zip or tape backup drive.

Companies like Dell could take a page from Gateway's book on easy case removal: Unlike the gripless side panel on Dell's Dimension XPS, which can be awkward to remove, the G6-266's side panel has a handle grip at the back, which makes it a snap to pop off. Inside, the system has plentiful room for expansion, with a spacious and orderly interior and lots of available slots, memory sockets, and drive bays.

The keyboard of the Gateway G6-266 is also distinctive: It boasts large keys, and an extra row at the top has special buttons that enable you to control audio CDs, sound level, and even a televi- ▶

sion and radio if you hook up the system to your home entertainment center.

We love Gateway's documentation. The glossy, well-laid-out manual offers concise, informative help and color illustrations. According to our reader survey, the quality of Gateway's support is above average, and the reliability rating of its systems has recently improved to average. The company provides a three-year warranty on parts and labor and 24-hour toll-free support.

4 QUANTEX QP6/300 SM-3X

PRO: Affordable, generous feature set, great support policies

CON: Generic documentation

Thanks to a $200 price reduction, Quantex's QP6/300 SM-3x moves up a notch this month, surpassing Micron's Millennia XKU 300. The Quantex's outstanding set of features and more affordable $2799 price make the difference. It's hard to find a Pentium II-300 PC priced under $3000. There's only one other on our chart—the DirectWave MVP VX2-300 at number eight, which also costs $2799. The midtower Quantex sports all the power essentials, such as 64MB of RAM, a generous 6.4GB hard drive, and a 56-kbps K56flex modem. The generous software bundle includes Microsoft Office 97 Small Business Edition—an improvement over the Lotus suite that comes with the DirectWave. ▶

TOP 20 POWER DESKTOPS

TEST REPORT

	SYSTEMS	CPU	RAM (MB)	Secondary cache (KB)	PC WorldBench score
1	Dell Dimension XPS D266*	Pentium II-266	64	512	264
2	Dell OptiPlex GXa266*	Pentium II-266	32	512	259
3	Gateway 2000 G6-266*	Pentium II-266	64	512	263
4	Quantex QP6/300 SM-3x*	Pentium II-300	64	512	269
5	Micron Millennia XKU 300*	Pentium II-300	64	512	270
6	Unicent Avanta L266	Pentium II-266	64	512	264
7	Gateway 2000 E-3100 PII-266	Pentium II-266	64	512	262
8	DirectWave MVP VX2-300	Pentium II-300	64	512	272
9	Sys Technology Performance 233M2	Cx6xB6MX-PR233	32	512	259
10	Kingdom Pinnacle 266/S	Pentium II-266	64	512	264
11	Sys Technology Performance Pro 300LA	Pentium II-300	64	512	277
12	Sys Technology Performance 233K6	AMD K6-233	32	512	251
13	HP Brio 233 MMX	Pentium MMX-233	32	512	239
14	Acma EXP Pro PII 266	Pentium II-266	32	512	258
15	IBM PC 300XL PII-266	Pentium II-266	32	512	264
16	DFI Landmarq XFX M500	Pentium II-266	64	512	263
17	DTK Quin-57M/PM233	Pentium MMX-233	64	512	241
18	Netis Starburst 266	Pentium II-266	32	512	257
19	Everex StepStation2	Pentium II-266	32	512	257
20	Amax GFX Pro 266	Pentium II-266	32	512	258

*Best Buy

Word 7.0 for Windows 95
Excel 7.0 for Windows 95
Picture Publisher 6.0 for Windows 95
Paradox 5.0 for Windows
WordPerfect 6.1 for Windows
1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).

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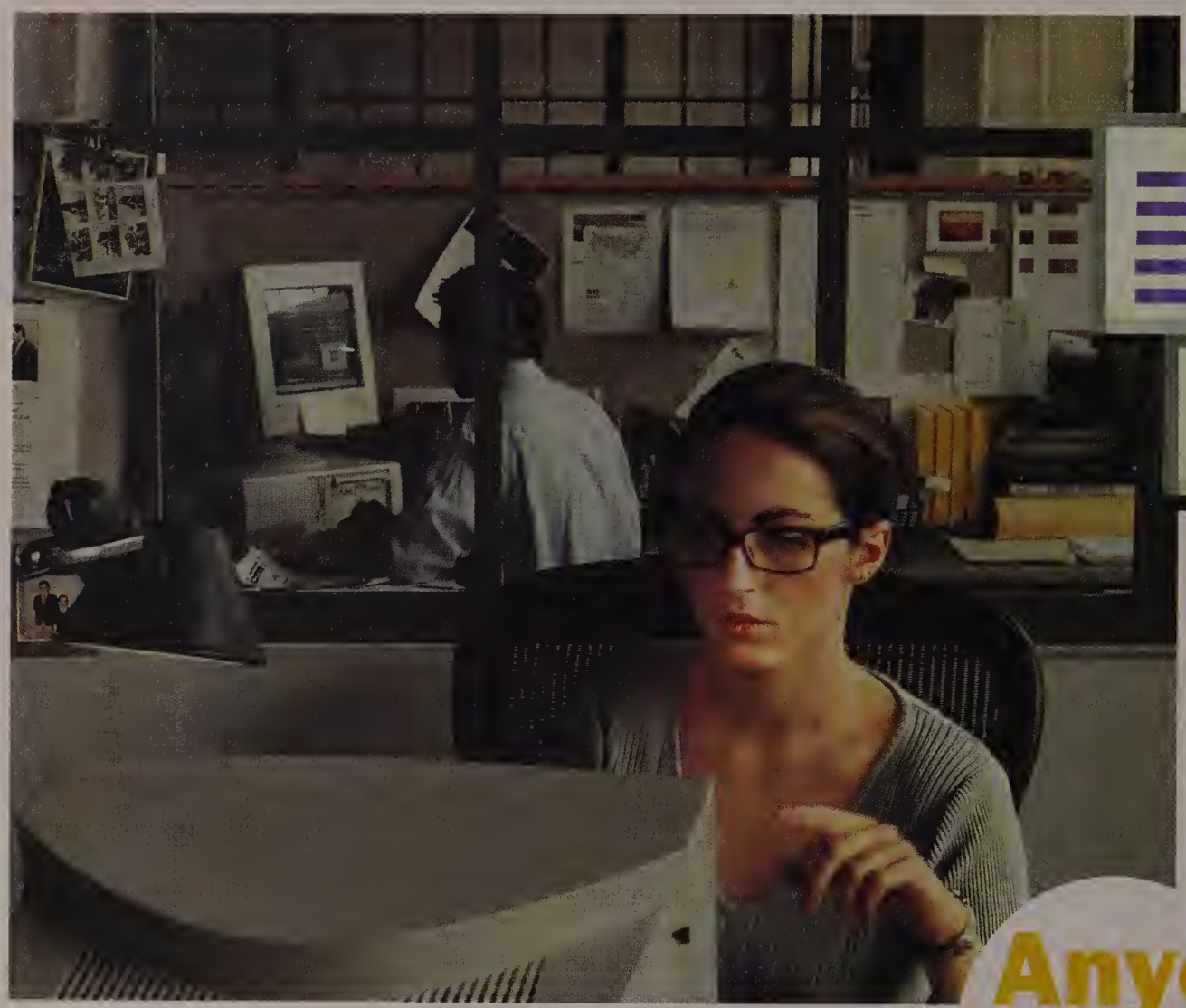

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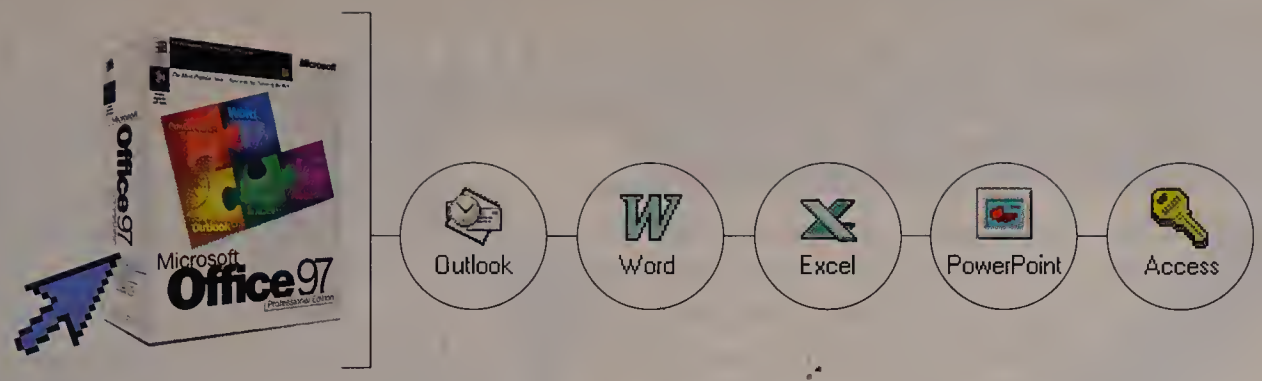

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The Quantex is a powerful performer, with a PC WorldBench score of 269. It all adds up to an alluring system for the small or home office.

Like all PII-300 systems, the QP6/300 SM-3x comes with AGP graphics. But Don't expect the AGP bus to help much with business applications. The Reva 128 chip installed in Diamond's Viper V330 card is one of the best 3D performers that we've seen on non-AGP systems, and it's fast with business applications as well. The 17-inch MAG InnoVision monitor that came with our test machine has a good display and intuitive controls.

Quantex QP6/300 SM-3X

Compared to what we've seen in other Quantex PCs, the overall interior design of the QP6/300 SM-3x runs true to form: a bit disorderly but relatively easy to upgrade. Cables are grouped in a messy cluster but don't interfere with access to the three vacant PCI slots and one free ISA slot.

Quantex documentation is, as usual, a little disappointing. The manual includes serviceable illustrations but offers only generic system information, without any particulars for the CPU type or model. However, the company's support policies are quite solid. In addition to round-the-clock support, Quantex backs its PCs with a three-year warranty for parts and a one-year labor warranty. Our reader survey says that Quantex's system reliability and support quality are average.

5 MICRON MILLENNIA XKU 300

PRO: Searing speed, $170 price drop, high-quality 19-inch monitor, Zip drive, great speakers

CON: Still pricey

The Millennia XKU 300 is a no-holds-barred SOHO dream box. This well-built system, with a breathtaking PC WorldBench score of 270, is one of the faster PCs we've tested. Its luxurious set of components includes a beautiful 19-inch monitor, and support is top-notch. Micron made the XKU a little more affordable this month by dropping the price another $170 to $3619, but it's still an expensive system.

On the test bench, the Millennia XKU 300 scored just 2 percent shy of the fastest machine we've tested—Sys Technology's Performance Pro 300LA, in 11th place on this month's power chart. To add a touch of perspective, that small a difference won't be perceptible to most users. A great Hitachi monitor displays crisp, evenly focused text and good-looking graphics from corner to corner. You'll be able to step up to 1280 by 1024 resolution without giving yourself eyestrain.

The built-in Zip drive is a convenient addition for backing up files and folders and sharing and transporting amounts of data too large to fit on a conventional floppy disk. You also get a good-size 6.4GB Ultra-DMA hard drive with a bus-master controller, a 12X–24X CD-ROM drive, and a fast 3Com/U.S. Robotics 56-kbps Sportster modem with x2 technology. This system—like the rest of the current crop of Pentium II-300 computers—also includes AGP graphics. Although you may not obtain any acceleration with the current crop of business applications, use of the AGP bus with its dedicated slot frees up a PCI slot that would otherwise be occupied by a graphics card.

Micron Millennia XKU 300

The XKU is set up to entertain: With the popular Sound Blaster AWE64 card and a Cambridge SoundWorks system that includes a subwoofer and satellite speakers, it produces better audio than many home stereos. People who use their PCs for digital recording will particularly appreciate the sound card's full-duplex capabilities, which allow the user to record and play simultaneously. Micron's support policies are industry standard, including a three-year parts warranty, a one-year labor warranty, and round-the-clock toll-free phone support. Better yet, according to our newest survey results, Micron rates above average for both the reliability of its systems and the quality of its support.

New This Month

The following PCs made our power desktops chart for the first time this month. For brief reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

10 KINGDOM PINNACLE 266/S

PRO: Very good performance, inexpensive, clear and concise documentation

CON: Lackluster sound system, generic components, some cable clutter

Kingdom's formula is simple: Deliver good performance and the essential features at a bare-bones price. Using this approach, Kingdom computers have become a fixture on our budget chart over the last year. But until now, no Kingdom machine has come up with the right combination to make the power chart. This month, the quick, affordable Pinnacle 266/S cracks the code and debuts smack in the middle of our power rankings.

Kingdom Pinnacle 266/S

To offer this Pentium II-266 with 64MB of RAM, a 4.3GB hard drive, and a 17-inch monitor for only $2597, Kingdom eschews some of the name-brand components you'll find on big-name PCs. In their place, you get a Zoltrix K56flex speakerphone modem and mike and a CyberDrive 12X–24X CD-ROM drive. Although the motherboard had an Accelerated Graphics Port, Kingdom didn't include an AGP graphics card, which would provide limited benefit for its added cost. Instead, the company used the Hercules Terminator 3D PCI card with 4MB of EDO RAM—a reasonably good performer in our graphics card tests. Kingdom also included its own 17-inch Kingdom 70i monitor—a good display for most business computing and better than what you get with many other low-cost PCs.

The Kingdom was a hair faster than the average Pentium II-266 on our PC WorldBench tests, scoring 264. And as with other Kingdom PCs we've seen, the Pinnacle's midtower case is sturdy. Rubber feet on each corner help keep the unit stationary. You need a screwdriver to remove the side panel. The interior gives you ▶

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ample room for expansion, but we wish it were a little neater: The highest and lowest of the three available internal drive bays were somewhat crowded by cabling.

The Pinnacle's sound system, while okay for business audio, needs upgrading to compete with offerings from Dell, Gateway 2000, Micron, and other top companies. While the Ensoniq Wavetable 3D sound card is quite capable, the Mli 170 speakers, sans subwoofer, are tinny. For $57 extra you can get a better set of speakers with a subwoofer, or for $87 above the base rate you can get the better subwoofer/speaker set and the more capable Sound Blaster AWE64 sound card. The software bundle is reasonably good, including Lotus SmartSuite 97, a Windows tutorial, and Compton's Interactive Encyclopedia.

Sys Performance Pro 300LA

Kingdom did a good job with its documentation. While the manual is not as visually oriented as some of the others we've studied, it reads easily and includes a helpful troubleshooting guide. Kingdom's warranty is industry standard: three years on parts and one year on labor. Our anonymous calls to technical support were dealt with promptly and courteously, and we received helpful answers.

11 SYS TECHNOLOGY PERFORMANCE PRO 300LA

PRO: Blazing speed, top-notch components

CON: Fairly expensive, no user guide

The Sys Technology Performance Pro 300LA is the fastest PC we've ever tested, and it packs some impressive components. But at $3210 without business applications, it's not an inexpensive PC.

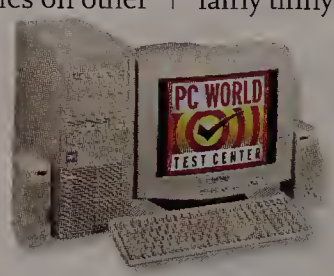
Still, if you must have the fastest system on the block, the Sys Performance Pro 300LA is the one. Its PC WorldBench score of 277 is 5 points higher than that of the next fastest system we've tested, 3 percent faster than the average Pentium II-300—enough to stroke the ego, even if you'll be hard-pressed to detect much difference in day-to-day computing.

The components are noteworthy, from the 6.4GB Ultra-DMA hard drive, to the Number Nine Revolution 3D AGP graphics card with 8MB of WRAM, to the good-looking 17-inch Sys SPM-17-MS monitor. The Sound Blaster AWE64 wavetable full-duplex sound card is well matched with a good-sounding set of MLI-818 speakers. The Cardinal Connecta 56-kbps modem, using 3Com/U.S. Robotics' x2 protocol, is another nice addition.

This midsize tower is sturdy and well designed. Its interior is clean and uncluttered, thanks in large part to the tubular connector cables. Plenty of expansion slots, memory sockets, and drive bays are available.

The system documentation for this PC could be better. It consists of component manuals but no user guide. If you're not a technical whiz, you may have a hard time finding the information you need.

You'll also have a hard time keeping this PC's warranties straight. Sys Technology covers different parts of its systems for different periods of time. The good news is that the CPU and the memory are covered for six years; the warranties on other components run from one to five years. Labor is covered for five years and on-site service for one year.



DFI Landmarq XFX M500

Sys Technology's technical support is limited compared to that of big vendors like Dell. You get toll-free support around the clock for the first year, but then support drops to 9 hours per weekday, and you pay any toll charges. Recent anonymous calls to the company's support line were disappointing. We had to leave a number of messages before getting a response, and when we reached tech staffers, they were impatient and sometimes rude.

16 DFI LANDMARQ XFX M500

PRO: Inexpensive, quick, good interior design with plenty of room for expansion

CON: Short support hours, mediocre monitor, lacks user guide

DFI's Landmarq XFX M500 is a relatively inexpensive and generally well-configured PII-266 PC with a clean, accessible design. Its construction and assembly are better than most, and its performance is quick—the PC WorldBench score of 263 is above average for a PII-266. With better support, this $2699 midsize tower would rank higher on our chart.

Although generic-looking on the outside, the M500 has an impeccable interior. All the cables are neatly tied out of the way, making it a snap to access the generous complement of expansion slots, memory sockets, and drive bays.

This PC isn't loaded with latest-and-greatest features like AGP video, but the Matrox Millennium II PCI card with 4MB of WRAM is a good basic graphics accelerator that easily handles typical business apps. And the 3Com/U.S. Robotics 56-kbps x2 modem is one of the quickest and most dependable performers available. The Sound Blaster AWE64 card with wavetable sound is likewise outstanding.

On the downside, the Hyundai DeluxeScan 17B+ monitor we got with our test PC was only so-so: It would be fine for typical business work, but small fonts were noticeably fuzzy. And the MLI-691H speakers included with this system were fairly tinny and made a poor match for the high-quality sound card.

DFI also could do a better job with its documentation: The manuals for individual components aren't bad, but a user guide would simplify the search for answers—especially for inexperienced users.

The company's support policies are a mixed bag: The two-year parts warranty is shorter than most, but you can't beat the lifetime labor warranty. and although DFI provides a toll-free support line, the hours are short—only 10 hours per weekday. In our anonymous calls we had trouble getting responses. Once we got through to a staffer, however, we received cheerful and courteous help. ▶

Beyond the Top 20: Online

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **HP Vectra VI PII 300**
- **Intergraph TD-225**
- **Vektron Super PowerStation PII-300**

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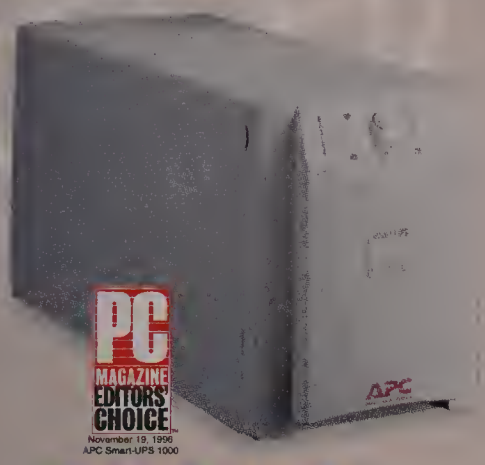

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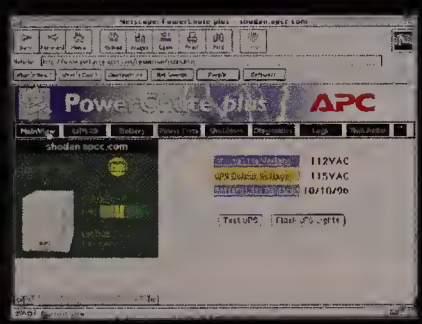

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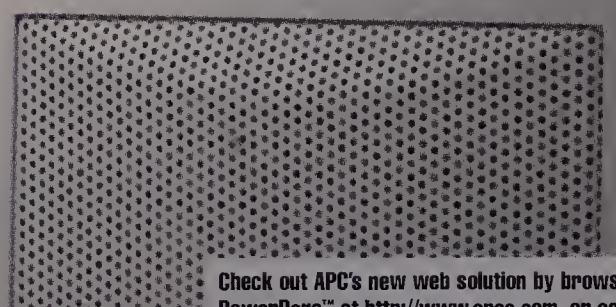

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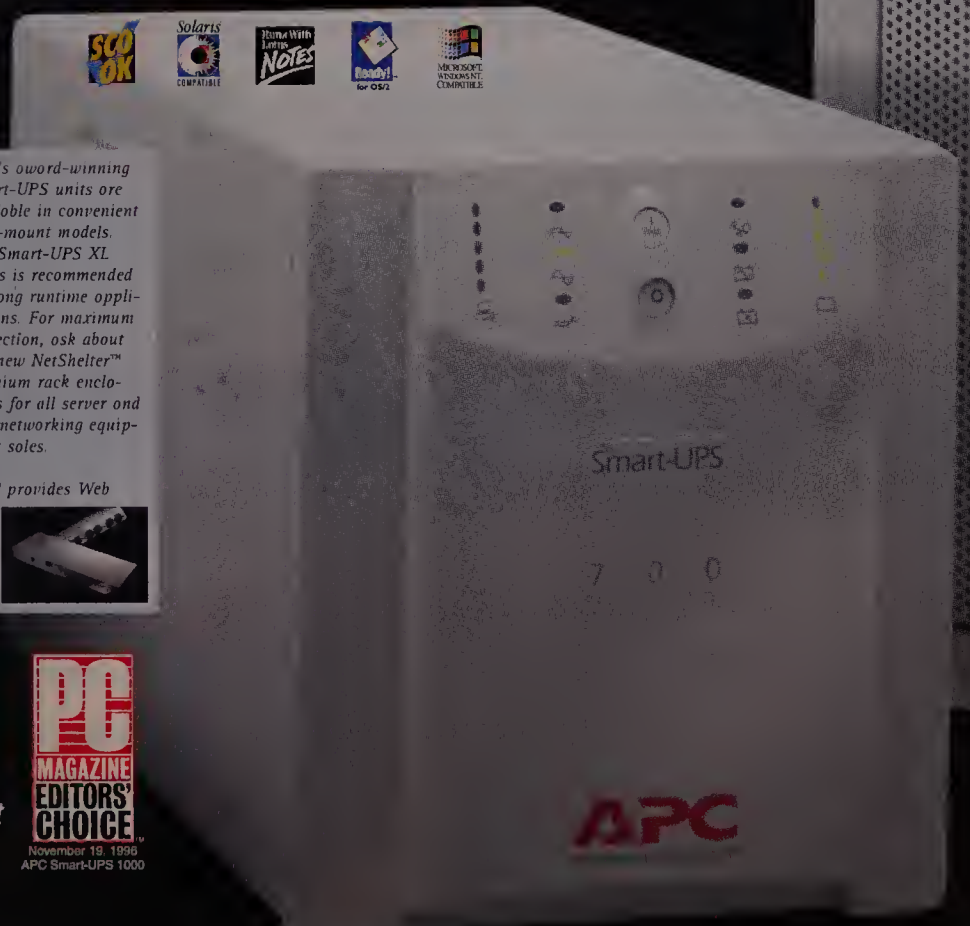

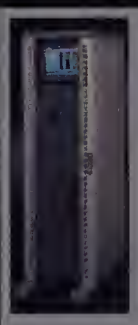

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PC MAGAZINE EDITORS' CHOICE
November 19, 1996
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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (11/17/97)	CPU	Comments
1	Gateway 2000 GP5-233 800/846-2000 www.gateway.com	5	Sept 97	$2004	Pentium MMX-233	$119 trimmed from price of fast full multimedia system, 56-kbps modem.
2	Quantex QP5/200 SM-1 800/896-4898 www.quantex.com	4	Oct 97	$1499	Pentium MMX-200	$200 cut on affordable multimedia PC, 56-kbps modem, great support policies.
3	Dell Dimension M200a 800/388-8542 www.dell.com	1	June 97	$1699	Pentium MMX-200	Last month for this PMMX—Dell replaces it in March with a PII that costs more.
4	Micro Express MicroFlex-P225J 800/989-9900 www.microexpress.net	2	Jan 98	$1399	AMD K6-233	Bargain price on fast multimedia PC with PC-to-TV graphics card, great warranty.
5	CyberMax PowerMax 800/437-4596 www.cybmax.com	3	Sept 97	$1249	AMD K6-166	Quick, low-cost AMD K6 tower, support available around the clock.
6	Gateway 2000 G6-233 800/846-2000 www.gateway.com	–	NEW	$1999	Pentium II-233	Low-cost PII has fast modem but small hard drive, slim software bundle.
7	Gateway 2000 E Series E-3110 800/846-2000 www.gateway.com	–	NEW	$2089	Pentium II-233	Fast corporate PII has modem, ethernet adapter, fine software bundle.
8	Micron Millennia MME 888/634-8799 www.micronpc.com	6	Jan 98	$1773	Pentium MMX-200	$136 drop on good budget PC for small or home offices, excellent support.
9	Dell OptiPlex Gn+233 800/388-8542 www.dell.com	9	Nov 97	$1872	Pentium MMX-233	$310 cut on well-designed corporate PC, ethernet, fine support; no free bays.
10	Micro Express MicroFlex-K5/5166D 800/989-9900 www.microexpress.net	7	Aug 97	$1249	AMD K5-PR166	Generic system has good video card, same great warranty as no. 4 Micro Express.
11	Kingdom Pinnacle 233V MMX 800/385-3436 www.kingdomcomputers.com	10	Jan 98	$1597	Pentium MMX-233	$50 price drop on well-rounded PC for small and home offices, expandable.
12	Unicent Avanta T233 800/308-3614 www.unicent.com	–	Jan 98	$2199	Pentium MMX-233	$200 price drop puts well-stocked small and home office PC on chart.
13	Micro Express MicroFlex-686/P200+LCE 800/989-9900 www.microexpress.net	12	Aug 97	$1399	Cx6x86-PR200+	$80 price drop on Cyrix-based multimedia PC with great warranty.
14	Innovative HV DT K6/200 800/989-7253 www.innovative-hv.com	–	NEW	$1645	AMD K6-200	Fast system has PC-to-TV graphics card; short support hours, so-so monitor.
15	AST Bravo MS 5166 800/876-4278 www.ast.com	–	Aug 97	$1430	Pentium MMX-166	$269 drop puts corporate PC on chart, ethernet; support quality's only so-so.
16	Everex Step Premier P233 MMX 800/383-7391 www.everex.com	–	Dec 97	$1550	Pentium MMX-233	Big $360 price drop earns well-designed PC a spot on chart; no speakers.
17	Polywell Poly K6233Mx 800/999-1278 www.polywell.com	15	Jan 98	$1986	AMD K6-233	Quick, nicely assembled system has large hard drive, long labor warranty.
18	Kingdom Pinnacle PV-200+ 800/385-3436 www.kingdomcomputers.com	16	Nov 97	$1197	Cx6x86-PR200+	Inexpensive PC now $50 cheaper, free surge suppressor; speed only adequate.
19	Sys Technology Performance 200K6 800/613-9963 www.systechnology.com	20	Aug 97	$1989	AMD K6-200	Swift, full-featured, has variable warranty, depending on component.
20	Compaq Deskpro 2000 Model 5200X/CDS 800/345-1518 www.compaq.com	19	Nov 97	$2158	Pentium MMX-200	Well-built SOHO PC has 33.6-kbps modem; skimpy 1MB graphics RAM.

Best Buy See features chart, page 242, test report, page 244.

[1] For more information about all products in this table, circle reader service no. 902.

[2] Insufficient data to give a rating.

YOU CAN GET A LOT FOR A LITTLE as prices fall and fall: Seven Top 20 PCs now sell for less than $1500, with two models costing only $1249 each. Price cuts reshuffle our Best Buys, with last month's number five Gateway 2000 and number four Quantex jumping to first and second place, respectively. Gateway's new G6-233 debuts as the first Pentium II under $2000 on our chart, along with the company's E-3110, a well-appointed PII corporate PC. A new Innovative HV system with a PC-to-TV card makes our list, while another Innovative HV failed to make the cut. Other also-rans include PCs from DFI, DTK, Intergraph, and Premio. For more on these machines, visit PC World Online (www.pcworld.com/t20pcs).

SCORECARD

★ Overall rating	Price	Features and design	Vendor's system reliability	PC WorldBench score/performance	Vendor's support quality/policies	Reader service number[1]
86	average	outstanding	average	240/very good	above average/best	620
86	inexpensive	very good	average	230/good	average/best	621
86	average	very good	above average	219/good	above average/best	622
86	inexpensive	very good	[2]	249/very good	[2]/best	623
85	inexpensive	very good	[2]	223/good	[2]/best	624
84	average	very good	average	247/very good	above average/best	625
84	average	very good	average	250/outstanding	above average/best	626
84	average	very good	above average	220/good	above average/best	627
83	average	good	above average	233/good	above average/best	628
82	inexpensive	very good	[2]	208/satisfactory	[2]/best	629
81	average	very good	[2]	237/very good	[2]/good	630
81	expensive	outstanding	[2]	239/very good	[2]/best	631
81	inexpensive	very good	[2]	217/good	[2]/best	632
79	average	very good	[2]	239/very good	[2]/poor	633
79	inexpensive	good	average	221/good	below average/best	634
79	inexpensive	good	[2]	224/good	[2]/best	635
79	average	very good	[2]	240/very good	[2]/good	636
78	very inexpensive	very good	[2]	207/satisfactory	[2]/good	637
77	average	very good	[2]	238/very good	[2]/good	638
77	expensive	good	average	222/good	average/best	639
Scorecard weightings ▶	Price 25 percent	Features 25 percent	Reliability 15 percent	Performance 15 percent	Quality/policies 10 percent each	

This Month's Best Buys

1 GATEWAY 2000 GP5-233

PRO: Fast, loaded, affordable

CON: Monitor a bit fuzzy at high resolutions

A price drop of $119 this month helps push Gateway 2000's GP5-233 all the way to the top of our budget chart. At $2004, the GP5-233 is a stylish and affordable midtower system for the small or home office. This Pentium MMX-233 posted a very good PC WorldBench score of 240. Its loaded multimedia configuration includes a 12X–24X CD-ROM drive, an Ensoniq Audio PCI Wavetable sound card, and fine Boston Acoustic speakers and subwoofer. And the bundled Microsoft Office 97 Small Business Edition is the office suite most buyers will prefer. On the other hand, the 17-inch EV700 display isn't the sharpest we've ever seen, although it's more than adequate for everyday business tasks. The speedy 4MB STB Virge graphics card has 3D acceleration for exciting game play.

Gateway 2000 GP5-233

On the whole, the GP5-233 is nicely constructed. The case shows little flex, although one bit of carelessness surprised us: The wires going from the sound card to the modem and CD-ROM drive were left unconnected. Gateway includes a comfortable keyboard and Microsoft's IntelliPoint mouse, which has a small wheel between its buttons to let you scroll Office documents with one finger.

Gateway's support is top-flight. Besides the three-year limited warranty on parts and labor, you get round-the-clock phone support and a year of free on-site service. Feedback from our readers indicates that support quality for Gateway desktops is above average; the company's system reliability rates average.

2 QUANTEX QP5/200 SM-1

PRO: Fast, affordable, comes with TV tuner

CON: Generic manual

Looking for a fast, inexpensive small-office system? Quantex's QP5/200 SM-1 delivers better-than-average Pentium MMX-200 performance, scoring a commendable 230 on our PC WorldBench test suite. After a hefty $200 price drop to just $1499, the QP5/200 SM-1 jumps from fourth to second place this month. This Quantex has a rich set of features. The graphics components are particularly good, including Matrox's 4MB Mystique 220 video card, teamed up with Matrox's Rainbow Runner video capture software and TV Tuner module. The 15-inch MAG InnoVision monitor provides good image quality and easy-to-use controls. Audio is handled capably by a 16-bit Ensoniq sound ▶

Quantex QP5/200 SM-1

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Gateway 2000 GP5-233*	Pentium MMX-233	32	512	2	STB Virge 4M8 3D PCI	4/VRAM	17/16	.28	12X-24X
2	Quantex QP5/200 SM-1*	Pentium MMX-200	32	512	3.2	Matrox Mystique 220	4/SGRAM	15/13.9	.28	12X-16X
3	Dell Dimension M200a*	Pentium MMX-200	16	512	3.2	integrated	2/DRAM	15/13.8	.28	12X-24X
4	Micro Express MicroFlex-P225J*	AMD K6-233	32	512	3.1	ATI 3D Pro Turbo PC2TV	4/SGRAM	15/13.7	.28	12X-24X
5	CyberMax PowerMax*	AMD K6-166	32	512	3.2	Matrox Mystique 220	4/SGRAM	15/13.8	.28	12X-24X
6	Gateway 2000 G6-233	Pentium II-233	32	512	2	STB Velocity 128 AGP	4/SGRAM	17/15.8	.28	12X-24X
7	Gateway 2000 E Series E-3110	Pentium II-233	32	512	3.2	STB Velocity 128 AGP	4/SGRAM	17/15.9	.28	12X-24X
8	Micron Millennia MME	Pentium MMX-200	16	512	2.1	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	15/13.6	.28	12X-24X
9	Dell OptiPlex Gn+233	Pentium MMX-233	32	256	3.2	integrated S3 Trio64	2/VRAM	15/13.8	.25	12X-24X
10	Micro Express MicroFlex-K5/5166D	AMD K5-PR166	32	512	2.1	ATI PC2TV	2/WRAM	15/13.8	.28	12X-16X
11	Kingdom Pinnacle 233V MMX	Pentium MMX-233	32	512	3.3	Hercules Dynamite 128	2/MDRAM	15/13.6	.28	12X-24X
12	Unicent Avanta T233	Pentium MMX-233	64	512	6.4	Matrox Millennium II	4/WRAM	17/15.8	.26	12X-24X
13	Micro Express MicroFlex-686/P200+LCE	Cx6x86-PR200+	32	512	4	STB Velocity 3D	4/VRAM	17/15.8	.28	12X
14	Innovative HV DT K6/200	AMD K6-200	32	512	3.2	ATI 3D Pro Turbo PC2TV	8/SGRAM	17/15.7	.28	12X-24X
15	AST Bravo MS 5166	Pentium MMX-166	32	512	2	integrated	2/SGRAM	15/13.6	.28	12X-16X
16	Everex Step Premier P233 MMX	Pentium MMX-233	16	512	2.1	Matrox Mystique 220	4/SGRAM	15/13.6	.28	12X-24X
17	Polywell Poly K6233Mx	AMD K6-233	32	512	5.1	Diamond Stealth 3D 2000	4/EDO DRAM	17/15.6	.28	12X-24X
18	Kingdom Pinnacle PV-200+	Cx6x86-PR200+	16	512	2.6	Hercules Terminator 3D	2/DRAM	15/13.8	.28	12X-24X
19	Sys Technology Performance 200K6	AMD K6-200	32	512	3.2	Matrox Millennium II	4/WRAM	17/15.8	.26	12X-24X
20	Compaq Deskpro 2000 Model 5200X/CDS	Pentium MMX-200	32	256	3.2	integrated	1/SGRAM	17/15.6	.28	12X-16X

* Best Buy [1] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology. [2] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

card and a pair of Altec Lansing ACS 45 speakers. And you get a 56-kbps K56flex fax-modem along with a software bundle that includes Microsoft Office 97 Small Business Edition and Demolition Derby, a car-racing CD-ROM.

Like most Quantex systems, the QP5/200 is sturdy and expandable. Our test unit had plenty of space for adding RAM, cards, and drives. We did note a few unruly cables, however.

The system manual is serviceable but generic to all Quantex systems. Toll-free technical support is available around the clock. Our anonymous calls got responses within 5 minutes and revealed a friendly, patient support staff. The warranty covers parts for three years and labor for one, standard in the industry today.

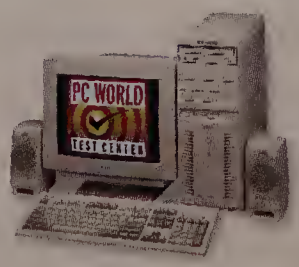
3 DELL DIMENSION M200A

PRO: Above-average support, very good design

CON: Monitor could be sharper, short on RAM

Big price drops on the Gateway 2000 GP5-233 and Quantex QP5/200 SM-1 have pushed the Dimension M200a from number one down to a midpack Best Buy this month. And from what Dell tells us, this model will not be available at all by next month; look for a review of an affordable budget version of the Dell Dimension XPS D266 in our next issue.

Dell's M200a is a good choice for a person who's left the corporate nest to go solo. At $1699, it covers the bases very well. Except for the 2MB of video RAM, which you may find somewhat limiting (it won't let you display true color at high resolutions), the M200a comes well stocked. The 56-kbps x2 modem and 12X–24X CD-ROM drive are top of the line. Microsoft Office 97 Small Business Edition is a good all-in-one business suite. We recommend only two upgrades, totaling an extra $150 or so: First, get Dell's higher-quality 15-inch monitor, the 800LS Trinitron. It costs only $49 more than the included 15-inch LS monitor, which lacks sharpness at high resolutions. Second, spend $100 on another 16MB of RAM. The M200a performed well for a low-cost system with only 16MB of RAM, scoring 219 on PC World-



Dell Dimension M200a

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (KB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
56 [1]	Ensoniq Audio PCI Wavetable	midtower	256	512	1	3/2	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
56 [2]	Ensoniq Audio PCI S5016	midtower	256	512	4	3/2	5	3/1	24	Sat., Sun.	BBS, WWW
56 [1]	Sound Blaster 16	midtower	64	512	1	3/1	6	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
56 [2]	Sound Blaster AWE64	midtower	256	512	2	3/0	3	4/4	24	Sat., Sun.	WWW
33.6	Ensoniq Audio PCI Wavetable	tower	384	512	5	3/2	5	3/1	24	Sat., Sun.	BBS, WWW
56 [1]	OEM Ensoniq Voyetra Audio PCI	midtower	384	512	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
56 [1]	OEM Ensoniq Audio PCI	midtower	384	512	2	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
56 [1]	integrated	midtower	256	512	1	2/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
–	Sound Blaster Vibra 16	desktop	256	256	1	0/0	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
33.6	Superior Sound32	midtower	128	512	4	3/2	3	4/4	24	Sat., Sun.	WWW
33.6	Ensoniq Audio PCI ES1370	midtower	256	512	4	2/3	4	3/1	15.5	Sat.	WWW
56 [1]	Ensoniq Audio PCI 9726	midtower	256	512	5	3/1	4	5/3	24	Sat., Sun.	BBS, WWW
33.6	Sound Blaster AWE64	midtower	512	512	2	2/3	3	4/4	24	Sat., Sun.	WWW
56 [1]	Crystal PnP Audio System	desktop	256	512	4	2/2	3	3/3	9	–	AOL, BBS, CIS, MSN, WWW
–	integrated	desktop	256	512	2	2/0	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, WWW
33.6	Ensoniq Audio PCI ES1B6B	midtower	256	512	4	3/2	4	3/3	24	Sat., Sun.	AOL, BBS, WWW
33.6	OEM CS37W-3DIS/C	midtower	256	512	5	3/0	4	3/5	10	Sat.	WWW
33.6	Ensoniq Audio PCI ES1B6B	midtower	256	512	4	2/3	4	3/1	13	Sat.	WWW
33.6	Sound Blaster AWE64	midtower	256	512	4	3/1	3	varies[3]/5	24 [4]	Sat., Sun.[4]	WWW
33.6	integrated ESS ES1B6B	midtower	384	512	2	2/0	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW

[3] Six years on CPU and main RAM, one to five years on other parts. [4] After one year, support drops to 9 hours on weekdays, with no weekend support.

Bench. But if you work with more than a couple of programs open at once, you'll definitely feel the pinch.

Perhaps most important, Dell minimizes the stress of SOHO computing with fine support—very important when you don't have an IS department to turn to for help. If you're doing your own troubleshooting, you'll appreciate the M200a's comprehensive, easy-to-read documentation. If you must call Dell for assistance, you stand a good chance of reaching a helpful technician; Dell advertises round-the-clock tech support, but you may need some patience. When we've called after hours, we spent so much time on hold we hung up. According to readers, though, the quality of Dell's support is above average; ditto on Dell's system reliability.

4 MICRO EXPRESS MICROFLEX-P225J

PRO: Terrific performance, great warranty

CON: Manual too technical, loud keyboard

The MicroFlex-P225J packs serious performance with its 233-MHz AMD K6 processor. The P225J's speed—second fastest on the budget desktops chart—and its low $1399 price helped this plain but well-supported midtower fly past PCs from larger competitors like Dell, Gateway, and Micron.

One of this system's best features is the ATI 3D Pro Turbo PC2TV video card, which you can also hook up to your TV, VCR, or camcorder. The Sound Blaster AWE64 wavetable sound card is also solid. Otherwise, the P225J is a barebones box, with highly technical documentation and no easy-open case. At this price the system doesn't come with any applications, and we didn't care much for the clattery standard keyboard.

Micro Express's support is a mixed bag. Its policies are among the best in the industry—a four-year warranty on parts and labor, free on-site service for the first year, a two-day turnaround policy for all repairs, and around-the-clock toll-free phone support. But getting through to the company's tech support required patience—we had to leave messages three of the five times we called. The two reps we did speak with, however, were courteous and helpful. ▶

MicroFlex-P225J

5 CYBERMAX POWERMAX

PRO: Inexpensive, fast, top support policies

CON: Documentation not integrated

AMD's K6 chip strikes again, this time inside the multimedia-wise CyberMax PowerMax, a Best Buy for the third month. Multimedia enthusiasts and game players will want to take a close look at this sturdy and expandable bargain-price tower, built around the 166-MHz version of AMD's PMMX-comparable K6 processor. With a PC WorldBench score of 223, the PowerMax is a match for some Pentium MMX-200 PCs, but it sells for just $1249.

The PowerMax has a 4MB Matrox Mystique 220 video card and a sharp Princeton EO50 monitor. Sound is handled well by Ensoniq's Audio PCI Wavetable sound system and Altec Lansing ACS 45 speakers with subwoofer. CyberMax throws in a couple of 3D game titles, as well as Corel's WordPerfect Suite.

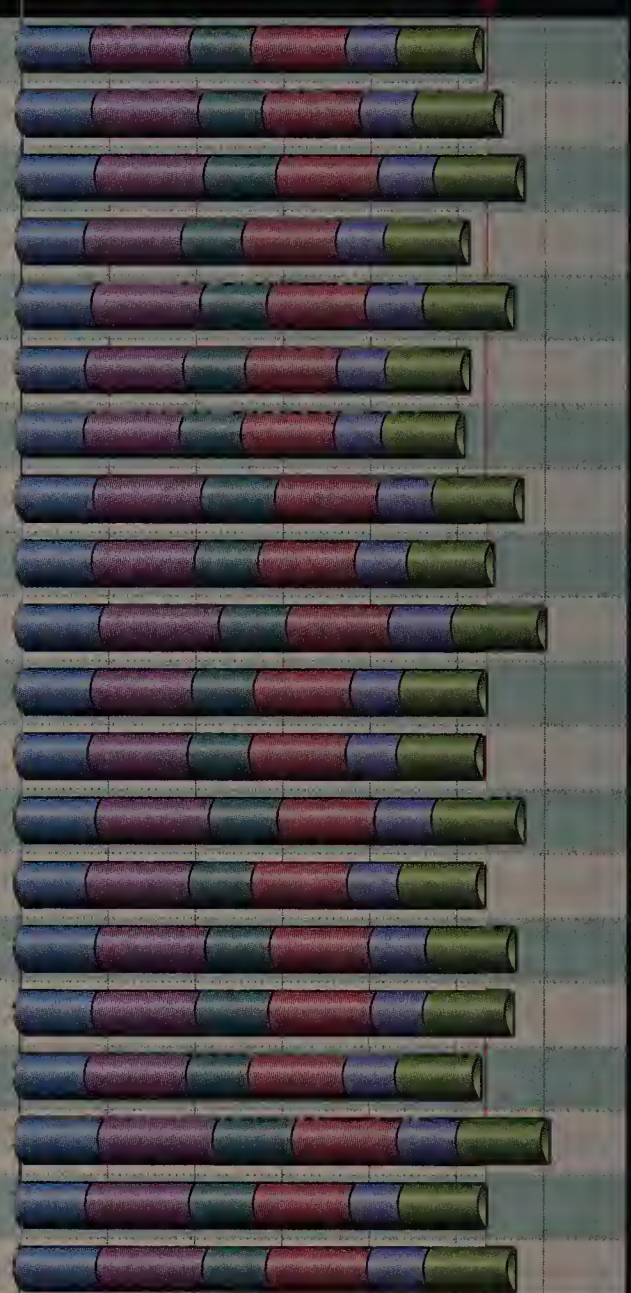
CyberMax PowerMax

The user guide provides little info about the system, leaving you with just the component manuals. The support policies are solid, with a three-year warranty on parts, one-year coverage on labor, and round-the-clock technical support. ▶

TOP 20 BUDGET DESKTOPS

TEST REPORT

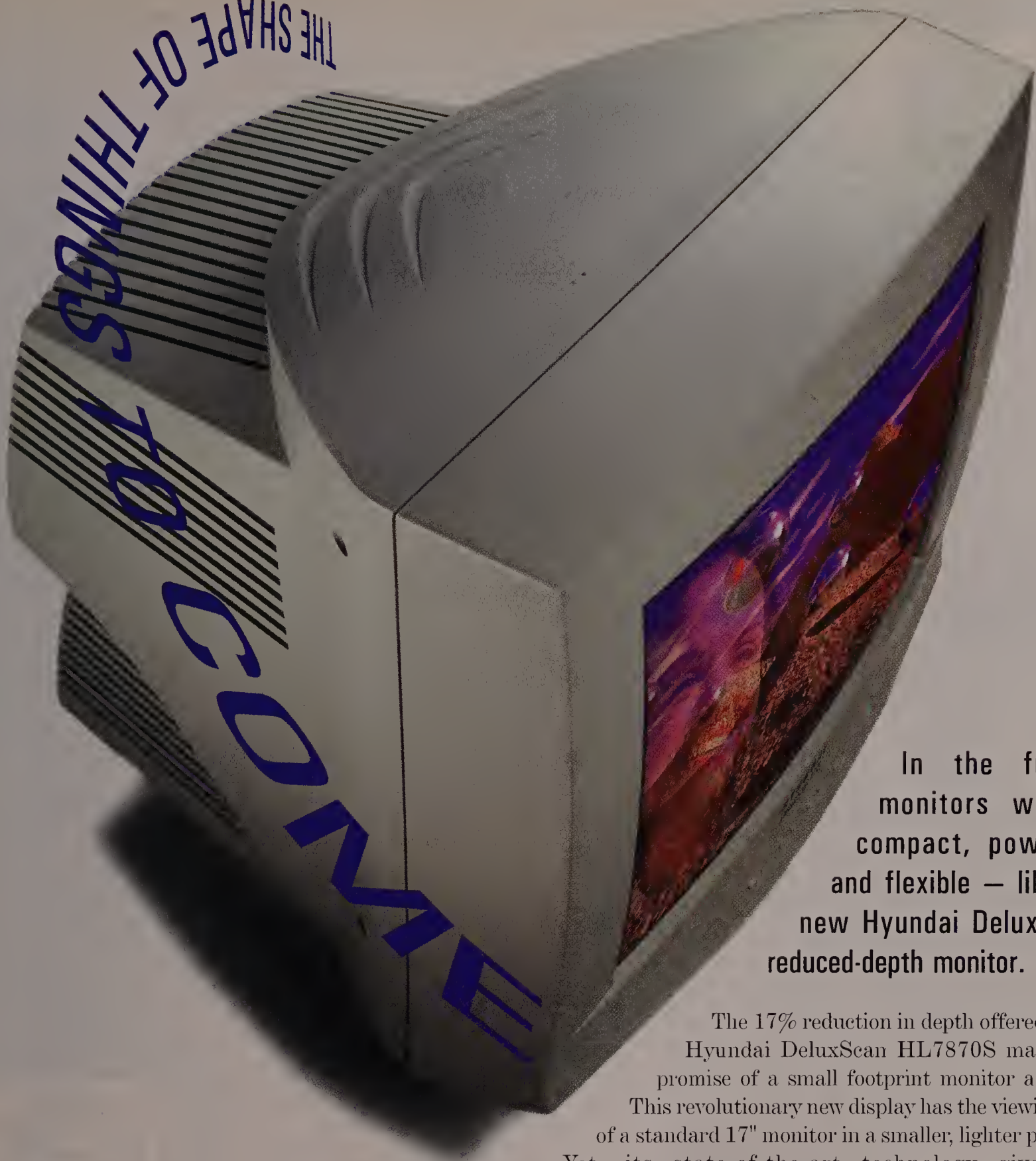
	SYSTEMS	CPU	RAM (MB)	Secondary cache (KB)	PC WorldBench score
1	Gateway 2000 GP5-233*	Pentium MMX-233	32	512	240
2	Quantex QP5/200 SM-1*	Pentium MMX-200	32	512	230
3	Dell Dimension M200a*	Pentium MMX-200	16	512	219
4	Micro Express MicroFlex-P225J*	AMD K6-233	32	512	249
5	CyberMax PowerMax*	AMD K6-166	32	512	223
6	Gateway 2000 G6-233	Pentium II-233	32	512	247
7	Gateway 2000 E Series E-3110	Pentium II-233	32	512	250
8	Micron Millennia MME	Pentium MMX-200	16	512	220
9	Dell OptiPlex Gn+233	Pentium MMX-233	32	256	233
10	Micro Express MicroFlex-K5/5166D	AMD K5-PR166	32	512	208
11	Kingdom Pinnacle 233V MMX	Pentium MMX-233	32	512	237
12	Unicent Avanta T233	Pentium MMX-233	64	512	239
13	Micro Express MicroFlex-686/P200+LCE	Cx6x86-PR200+	32	512	217
14	Innovative HV DT K6/200	AMD K6-200	32	512	239
15	AST Bravo MS 5166	Pentium MMX-166	32	512	221
16	Everex Step Premier P233 MMX	Pentium MMX-233	16	512	224
17	Polywell Poly K6233Mx	AMD K6-233	32	512	240
18	Kingdom Pinnacle PV-200+	Cx6x86-PR200+	16	512	207
19	Sys Technology Performance 200K6	AMD K6-200	32	512	238
20	Compaq Deskpro 2000 Model 5200X/CDS	Pentium MMX-200	32	256	222



*Best Buy

Word 7.0 for Windows 95 · Excel 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · Paradox 5.0 for Windows · WordPerfect 6.1 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC World8ench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).



In the future, monitors will be compact, powerful, and flexible — like the new Hyundai DeluxScan® reduced-depth monitor.

The 17% reduction in depth offered by the Hyundai DeluxScan HL7870S makes the promise of a small footprint monitor a reality. This revolutionary new display has the viewing area of a standard 17" monitor in a smaller, lighter package. Yet, its state-of-the-art technology gives you uncompromising performance and features, including 1280 x 1024 resolution, .27 dot pitch, and Advanced Digital On-Screen Controls — all at prices comparable with today's classic 17" monitors.

Experience the future with a new Hyundai DeluxScan reduced-depth monitor. ***It's the shape of things to come.***

For more information on the DeluxScan reduced-depth monitor, or any of the products in the DeluxScan monitor family, visit the Hyundai Web site at www.hea.com or call 1-800-568-0060

Model	CRT/Viewable	Max Resolution	Controls	Dot Pitch	ESP*
14S	14"/13.2"	1024x768	Digital	.28	$189
15B	15"/13.7"	1024x768	Digital	.28	$249
17MS	17"/15.7"	1024x768	Digital	.39	$389
15G+	15"/13.7"	1280x1024	Digital On-Screen	.28	$299
17B+	17"/15.7"	1280x1024	Digital On-Screen	.28	$499
17S	17"/15.7"	1280x1024	Digital On-Screen	.27	$599

*Estimated street price 6/97. Dealer prices may vary. Does not include shipping and handling.

A 17" monitor with the footprint of a 14" monitor.

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DeluxScan® Monitors

Circle 110 on reader service card

New This Month

The following PCs made our budget desktops chart for the first time this month. For brief reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

6 GATEWAY 2000 G6-233

PRO: Very good performance and design

CON: Small hard drive, skimpy software bundle

Shopping for a name-brand Intel-powered PC that costs less than $2000? Gateway 2000's new G6-233 wraps up a PII CPU in a $1999 package—creating a fast, expandable, and well-supported system for small or home offices.

Gateway 2000 G6-233

The G6-233's 233-MHz CPU is the least powerful PII, but it scored 247 on our PC WorldBench test—6 percent faster than the average Top 20 budget system and within 6 percent of the average score for 266-MHz and 300-MHz PCs.

The G6-233's configuration includes a fair general-purpose 17-inch monitor (Gateway's EV700), along with a 4MB STB Velocity 128 AGP card. Gateway throws in its own 56-kbps x2 modem but includes just a skimpy 2GB hard drive.

Business users will find the software bundle lightweight, although Microsoft's Encarta, Works, and Money, in the company of Quicken SE and McAfee Antivirus, should light up the eyes of first-time buyers.

Gateway's documentation is among the best, and its support policies include a three-year parts-and-labor warranty and tech support around the clock. Support quality is above average too, according to our reader survey, and reliability rates as average.

7 GATEWAY 2000 E-3110

PRO: LAN adapter and management software

CON: Curved top of midtower case makes it hard to stack external components

The Gateway 2000 E Series E-3110 is a fast budget system that competes well against other corporate PCs from major vendors. Powered by a Pentium II-233 CPU, it cranked out a PC WorldBench score of 250—among the best on our budget chart. The E-3110 comes with all the usual corporate perks, including a LAN adapter, and DMI-2 client management software that lets administrators perform remote software upgrades.

For $2089, the E Series E-3110 comes with an STB AGP graphics card and a 17-inch Gateway 2000 EV700 monitor. The latter is acceptable for average business use, but for higher-end graphics work or use with ultrasmall fonts, consider spending an extra $75 for the better Vivitron 700. Or if your budget permits, splurge on the EV900, a 19-inch monitor that costs $200 more than the EV700. The EV900's larger screen will allow most users to increase resolution from 1024 by 768 to 1280 by 1024—putting a lot more on screen and providing smoother graphics.

Gateway even throws in some tidbits that many corporate systems lack, such as a 56-kbps x2 modem with a bundled communications suite, Ensoniq Audio PCI sound, and reasonably good-sounding Altec Lansing ACS-41 speakers. Unlike some companies that leave business software out of their corporate packages (Dell, for example), Gateway includes an offering with general appeal: Microsoft's Office 97 Small Business Edition, Streets Plus, and Encarta, along with Gateway's Info Highway (which lets you use Gateway's Internet service free for two months).

Gateway E Series E-3110

The color-coded cables and ports make attaching peripherals easy, and you don't need a screwdriver to remove the cover. Just twist off two large screws with your fingers, slide back the side panel, and behold a neat and orderly interior. Readers rate the reliability of Gateway's desktops as average—up from fair: That rating's as good as HP's and IBM's but not as good as Dell's or Micron's. Gateway's support quality is above average, and its strong support policies include a three-year parts-and-labor warranty and tech support around the clock.

14 INNOVATIVE HV DT K6/200

PRO: Fast, sturdy construction, PC-to-TV feature

CON: Short support hours, mediocre monitor, documentation could be better

The $1645 Innovative HV DT K6/200 is a fast multimedia system that comes with some fairly nice equipment for this price. You'll probably want to buy a different monitor, however, and if short support hours are a problem, you might want to look elsewhere.

Innovative DT K6/200

This system's PC WorldBench score of 239 is 3 percent better than the average budget desktop's, and it's one of the best any 200-MHz AMD K6-based PC has earned.

The expandable K6/200's desktop case is generic looking but roomy. One of this system's more unusual components is its ATI 3D Pro Turbo PC2TV card with a whopping 8MB of SGRAM. This card lets you send output to a TV for gaming or presentations. The company throws in a 56-kbps 3Com/U.S. Robotics x2 modem to handle communications.

But the Hyundai DeluxeScan 17B+ 17-inch monitor is only adequate—okay for typical business documents, but too fuzzy for work with fine print. The Crystal PnP sound card combines with the Innovative HV SP-201S Surround Sound speakers to produce fairly good audio.

System documentation consists of component manuals, with no unifying user guide. But the warranty is good, covering parts and labor for three years. Our anonymous calls to the company's tech support yielded courteous help. Unfortunately, the lines are open only 9 hours per weekday. (This company was formerly known as Diamond Technologies, before an acquisition in December.) ▶

Beyond the Top 20: Online

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **DFI Landmarq BTX M400**
- **Innovative HV DT P200 MMX**
- **DTK Quin-66/PM200**
- **Intergraph TD-25**
- **Premio Apollo Value 233 MMX**

"The ALR Revolution 6x6 *is a* FIRST-RATE *server* that offers *more* Scalability and *fault* Tolerance than most"

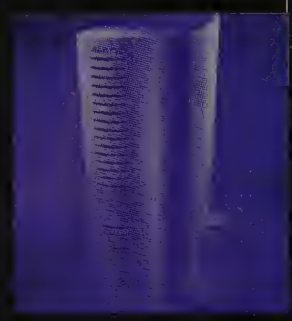
InfoWorld

With dual 300-MHz Pentium II processor support, server management and autorecovery technology built in, the ALR Revolution 2X offers big server features at a small price. We even offer an optional rack-mount kit!

starting at $2,295

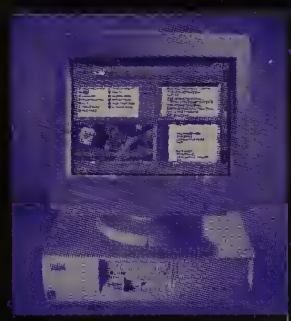
Boasting redundant power supplies, 13 drive bays, and support for dual Pentium® Pro or Pentium® II processors, the ALR Revolution 2XL redefines mid-range servers.

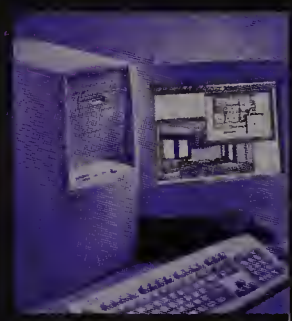
starting at $3,495



With the power of up to six Pentium® Pro chips and room for over 108-GB of storage, the ALR Revolution 6X6 is arguably the most advanced business server in the world. Redundant power supplies and ActiveCPR autorecovery technology make this an ideal platform for 7/24 environments.

starting at $7,995





ALR rack-mountable server and storage technology helps large corporations centralize network resources in a single convenient location

starting at $8,995

Featuring Pentium® II or Pentium processors with MMX™ technology, three different form factors and numerous available options, the new ALR Evolution series serves the entire range of business desktop users.

starting at $1,019

The ALR Evolution LT series packs the power of our Evolution desktops into a portable package. Fast processors, advanced multimedia features and a full range of options make these systems ideal for a wide range of mobile users.

starting at $2,267

intel inside PENTIUM-PRO PROCESSOR

MMX intel inside pentium II

If our Revolution 6X6 alone has *InfoWorld* magazine gushing with praise, imagine what they'll say when they catch a look at the rest of ALR's new product line. From the world's only SMP servers to support both Pentium® Pro and Pentium II processor technology, to corporate class desktops, to feature-packed notebooks, these new systems will help free your business from the bounds of mediocre computing.

Since 1986, when we introduced the world's first i386™-based PC, ALR systems have set the high mark for business computer performance. And this next generation is no exception. They've got all the performance you'd expect from the first company to break the 10,000 tpmC TPC-C™ barrier. They've got all of the reliability you'd expect from the company that won both *UnixReview's* and *InfoWorld's* "1996 Server Product of the Year" awards. And as for price, well... let's just say that you're in for a pleasant surprise.

How pleasant? You'll have to contact your ALR reseller to find out the answer to that question. For the one nearest you, call our toll free number today.

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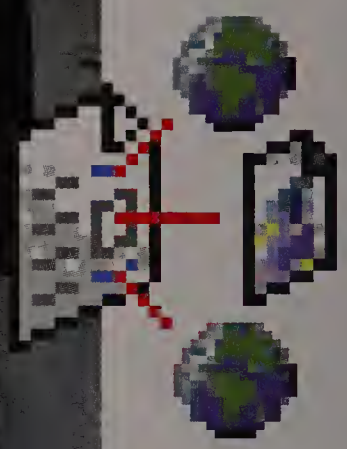
Circle 9 on reader service card



Building
still

For example, do you

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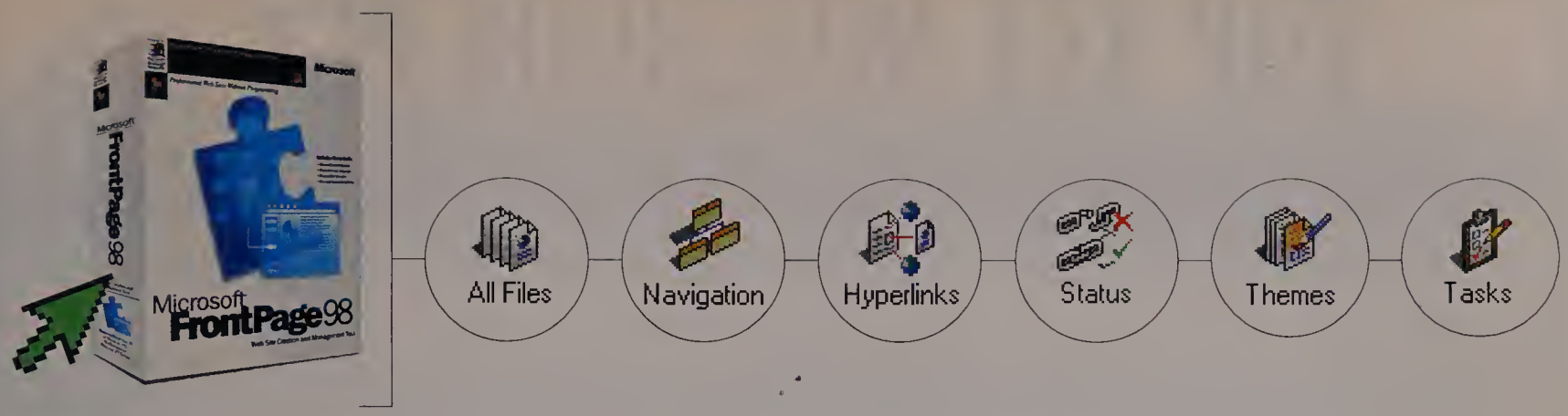

From: New Microsoft FrontPage 98
Time: Friday, 8:30 a.m.
To: Communications
Re: Anyone there know how to build a Web site?

Forget about all the coding **stuff**. Whether you're a novice or a pro, our new Microsoft® FrontPage® 98 program makes building a Web site as easy as typing a letter. That's because, as part of the Microsoft Office family, it's filled with familiar, intuitive tools. The new Navigation View helps you plan and organize your site. Drop your ideas into professionally-designed page themes, or use the new table drawing tool that makes designing pages as easy as sketching with a pencil. You can create and edit graphics and animation. As you work, you'll see your Web pages exactly the way they will look on the Web. And all the technologies that make Microsoft FrontPage 98 so powerful—such as Dynamic HTML and push technology—work behind the scenes. So when you're ready to go public, you just click on a single button and your site is on the Web. Check it out at www.microsoft.com/frontpage/. Yes, we built it with FrontPage 98. And yes, it was easy.

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requires programming skills.
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PC WORLD

TOP 10 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (11/2/97)	CPU	Comments
1	Gateway 2000 Solo 2300XL 800/846-2000 www.gateway.com	1	Dec 97	$3599	Pentium MMX-233	$150 price drop on ultrafast unit; no bay for second battery.
2	Micron Transport XKE 233 800/393-8935 www.micronpc.com	–	NEW	$5438	Pentium MMX-233	Great multimedia machine, marathon battery life; very expensive.
3	Transmonde Vibrant 166Tmx 800/988-2882 www.transmonde.com	3	Sept 97	$3320	Pentium MMX-166	Sturdy notebook really flies; support policies are thin.
4	Dell Inspiron 3000 M233XT 800/338-8542 www.dell.com	4	Jan 98	$3999	Pentium MMX-233	Terrific speed, great screen—ideal for presentations; battery life adequate.
5	Dell Latitude CP M233ST 800/338-8542 www.dell.com	5	Jan 98	$4399	Pentium MMX-233	Hot-rod speed, very light weight; no modem.
	BUDGET NOTEBOOKS					
1	Toshiba Satellite 225CDS 800/334-3445 www.computers.toshiba.com	5	Nov 97	$1599	Pentium-133	$400 off well-designed notebook; tech support free for only one year.
2	Gateway 2000 Solo 2300SE 800/846-2000 www.gateway.com	1	Nov 97	$2449	Pentium-133	Speedy for standard Pentium, ultralong battery life; subpar support.
3	CTX EZBook 750MS 800/888-9052 www.ctxintl.com	4	Aug 97	$1619	Pentium MMX-150	$130 drop in price for low-cost notebook; slow CD-ROM speed.
4	Fujitsu LifeBook 435Dx 888/466-8434 www.fujitsu-pc.com	3	Oct 97	$1799	Pentium MMX-133	Reasonably priced, snappy PMMX-133; screen could be better.
5	Transmonde Vibrant 133T 800/988-2882 www.transmonde.com	2	June 97	$2324	Pentium-133	$195 price increase for upgraded unit, strong battery; limited support hours.

Best Buy See features chart, page 252.

[1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive.

[2] For more information about all products in this table, circle reader service no. 903.

NOTEBOOK MAKERS continue their never-ending race to be the first out with a high-end alternative to desktops. Emerging product lines bring ever-bigger screens, better speakers, and performance rivaling that of desktops. Soon we will be testing portables equipped with DVD-ROM drives. Yet for now, sky-high prices and inherent upgrading difficulties, among other obstacles, keep portable systems from claiming the mantle held by the big beige box.

Micron's $5438 Transport XKE 233, which takes second place on the power notebooks chart this month, opens new territory with the most impressive set of multimedia features we've seen in a portable. This Pentium MMX-233—the only new notebook to make our charts—has sound, screen size, and speed to spare. With a $150 price drop and an upgraded hard drive, Gateway 2000's Solo 2300XL remains ensconced as our power Best Buy for the third month in a row. On the budget side, a big price cut makes the Toshiba Satellite 225CDS a great bargain and the Best Buy for the month.

POWER NOTEBOOKS

This Month's Best Buy

1 GATEWAY 2000 SOLO 2300XL

PRO: Breakneck speed, longest-lasting battery, good software bundle

CON: Support rating could be better, keys on keyboard are flat and somewhat slippery

Gateway 2000's latest Pentium MMX-233 notebook has nearly all the qualities we like in a laptop, including knockout speed, long battery life, and a great selection of software. The Solo 2300XL delivered an exceptional PC WorldBench score of 244—the highest ever in our notebook charts. Surprisingly, along with the great performance comes long battery life: The Solo 2300XL's lithium ion cell lasted for almost 9 hours.

Gateway Solo 2300XL

This solidly built system also comes with a handsome collection of features, including a 3Com/U.S. Robotics 56-kbps PC Card modem; the large selection of software ranges from business applications like Microsoft Office 97 Small Business Edition to reference titles such as Microsoft Bookshelf. Built-in speakers produce clear, crisp sound, although the audio becomes distorted when you crank up the volume. Gateway also provides headphones, in case you want to listen to audio CDs or play CD-ROM games when those around you prefer quiet.

The Solo is easy on the eyes: Its 12.1-inch active-matrix screen runs at 800 by 600 resolution and displays bright, clear,

SCORECARD

★ Overall rating	PC WorldBench score/ performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/ rating	Traveling weight [1]	Reader service number [2]
90	244/outstanding	average	average	outstanding	below average/fair	8:51/outstanding	average	640
89	241/outstanding	very expensive	above average	outstanding	[3]/fair	8:11/outstanding	heavy	641
84	218/very good	inexpensive	[3]	outstanding	[3]/poor	4:08/good	average	642
84	238/outstanding	average	average	very good	average/fair	3:33/good	average	643
84	241/outstanding	average	average	good	average/fair	4:38/good	light	644
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	
85	165/good	very inexpensive	average	good	below average/fair	3:19/good	average	645
84	196/very good	average	average	outstanding	below average/fair	7:32/outstanding	average	646
83	198/very good	very inexpensive	[3]	limited	[3]/poor	4:21/good	average	647
83	192/very good	very inexpensive	[3]	satisfactory	[3]/poor	3:42/good	average	648
81	190/very good	average	[3]	very good	[3]/poor	6:19/outstanding	heavy	649
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	

[3] Insufficient data to give a rating.

color-rich images. The system has a good-size keyboard and a responsive touchpad pointing device. However, we wished Gateway had sculpted the keys; we found them a little flat and slippery.

Like all Gateway systems, this unit comes with a comprehensive manual that provides helpful, well-labeled photos and an index for quick reference. The company backs its notebooks with a one-year warranty on parts and labor. If you need technical support, Gateway's lines are open around the clock.

New This Month

The following PC made our Power Notebooks chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

2 MICRON TRANSPORT XKE 233

PRO: Full range of multimedia features, fast

CON: High price, heavy

For a hefty price of $5438—the highest on this month's power chart—Micron's Transport XKE 233 delivers desktop-caliber power as well as almost every state-of-the-art audio and visual gizmo available for notebooks. This powerful combination makes the black, classy-looking Transport XKE ideal for multimedia presentations.

The Transport XKE's Pentium MMX-233 processor, supported by an ample 64MB of RAM, 512KB secondary cache, and 4.8GB hard drive, chalked up an impressive PC WorldBench score of 241. This accomplishment places the Transport XKE 233 among the fastest portables on the market today.

Micron Transport XKE

More speed means quicker screen transitions in presentations dense with graphics and video. Those images on the 13.3-inch active-matrix screen will also be crisp and rich with color, thanks to a NeoMagic MagicGraph 128XD video controller.

Presenting in front of a group? This portable is distinguished by its three audio and visual output ports. In addition to the standard CRT port for connecting to a monitor, the Transport XKE comes with an RCA composite port that allows hookup to a big-screen overhead display or television. Rarer yet, this notebook also has an S-Video port, which will give you even better resolution and color on the big screen.

This Transport XKE 233 also has better-than-average sound. You can listen to a CD via speakers located above the keyboard by the hinges, or you can use headphones. A port replicator, which you have to buy separately, has 3D Surround Sound speakers that are larger than those on the main unit.

Like a few other high-end portables we've seen, this one comes with autoplay, which means you don't have to turn the notebook on to play audio CDs. Plug in the headphones, and the 12X–20X CD-ROM drive turns on automatically; a full set of controls on the face of the drive makes adjusting the sound a snap.

In keeping with the spirit of putting just about everything in this notebook but ▶

PHOTOGRAPHS: KEN SMITH

TOP 10 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Gateway 2000 Solo 2300XL*	Pentium MMX-233	7.8	32	3	active	12.1	800 x 600	65,536	lithium ion	touchpad
2	Micron Transport XKE 233	Pentium MMX-233	9.2	64	4.8	active	13.3	1024 x 768	65,536	lithium ion	touchpad, eraserhead
3	Transmonde Vibrant 166Tmx	Pentium MMX-166	8.2	48	3.1	active	12.1	800 x 600	65,536	NiMH	touchpad
4	Dell Inspiron 3000 M233XT	Pentium MMX-233	7.6	32	2.1	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
5	Dell Latitude CP M233ST	Pentium MMX-233	6.8	32	2.1	active	12.1	800 x 600	16.8 million	lithium ion	touchpad
	BUDGET NOTEBOOKS										
1	Toshiba Satellite 225CDS*	Pentium-133	7.8	16	1.3	dual-scan	12.1	800 x 600	16.8 million	lithium ion	eraserhead
2	Gateway 2000 Solo 2300SE	Pentium-133	7.8	32	2.1	dual-scan	12.1	800 x 600	65,536	lithium ion	touchpad
3	CTX EZBook 750MS	Pentium MMX-150	7.8	16	1.4	dual-scan	12.1	800 x 600	65,536	NiMH	touchpad
4	Fujitsu LifeBook 435Dx	Pentium MMX-133	8.4	16	1.3	dual-scan	12.1	800 x 600	256	NiMH	touchpad
5	Transmonde Vibrant 133T	Pentium-133	9.6	32	1.4	active	12.1	800 x 600	65,536	NiMH	touchpad

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. [2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

leather upholstery, Micron also gives you two pointing devices—a touchpad and an eraserhead—as part of the standard package. Gamers will appreciate the addition of a MIDI/joystick port, also uncommon on a notebook. Dedicated ports allow you to use both the PS/2 keyboard and the mouse at the same time. You may want to add an external keyboard, since the wrist rests on the Transport XKE are small, even for a notebook.

You get outstanding battery life of more than 8 hours—almost twice that of most notebooks today. Another plus is the Transport XKE's two modem ports: one for a phone cord, the other for a cell phone in case you have to transmit from remote locations. But as a traveling companion, the notebook has some limitations. The company unfortunately did not see fit to include the fastest modem available. You get a 33.6-kbps internal model, which seems stingy considering the system's steep price. Moreover, you will think twice before lugging this 9.2-pound machine along on trips.

At the office, you can plug your notebook into the port replicator, a $500 optional accessory, which lets you keep an external keyboard and monitor hooked up at your desk and also includes a bay for charging an extra battery.

According to our reader survey, Micron notebooks are above average in reliability. The support for this Transport XKE is fair. It comes with a warranty of three years for parts and one year for labor, as well as toll-free support round the clock.

BUDGET NOTEBOOKS

This Month's Best Buy

1 TOSHIBA SATELLITE 225CDS

PRO: Great price, well built

CON: Oversensitive eraserhead pointing device

The good-looking Toshiba Satellite 225CDS made our budget chart last November because it delivered good performance and price, with a PC WorldBench score of 165 for less than $2000. Now a whopping $400 price drop to $1599 has pushed the Satellite all the way up to first place, making it our budget Best Buy for February.

Make no mistake: The no-frills Satellite's most outstanding feature *is* its price; the notebook is the least expensive of any on our Top 10 Notebook PCs chart. The CTX EZBook 750MS is a close second, but the others will cost you at least $200 more.

Toshiba Satellite 225CDS

This notebook has other strong points too. For example, the 12.1-inch dual-scan screen is reasonably bright and crisp—especially for a passive display—and the comfortable keyboard has large and well-placed keys. But Toshiba's eraserhead pointing device definitely takes some getting used to; we found it oversensitive and irritatingly hard to control. The 1.3GB hard disk, 10X CD-ROM drive, and 16-bit on-board sound are all average offerings for a budget portable these days. Toshiba does throw in some free software with the Satellite 225CDS: Microsoft Encarta and Quicken SE.

This notebook is well built, with a sturdy case and screen panel. Although it looks svelte, the 225CDS is a bit heavier than you'd think: It tips the scales at 7.8 pounds. The battery life is respectable—about 3.3 hours in our tests.

Toshiba did quite a good job on the manual: It's clearly written, nicely illustrated, and well indexed. Support policies are only fair, however. The parts and labor warranty and the company's toll-free round-the-clock tech support last for only one year. Toshiba notebook reliability is average, according to our reader poll, and the company's support quality rates as below average.

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
10X	56 [2]	192	1	○	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-20X	33.6	192	2	●	●	●	3/1	24	Sat., Sun.	BBS, CIS, WWW
10X	33.6	64	0	●	●	●	1/1	11	–	WWW
12X-20X	–	144	1	●	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-20X	–	128	1	●	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
10X	–	144	1	●	●	●	1/1	24	Sat., Sun.	BBS, CIS, MSN, WWW
10X	56 [2]	192	1	●	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	–	72	2	●	●	●	1/1	12	–	WWW
10X	–	80	1	●	●	●	1/1	24	Sat., Sun.	Prodigy, WWW
12X-16X	33.6	64	1	○	○	●	1/1	11	–	WWW

RUNNERS-UP

Beyond the Top 10

NINE OF THE TEN notebooks we tested this month did not earn positions on our charts. Two, though, came close.

The **Digital Ultra HiNote Ultra 2000** is remarkable for its eye-pleasing 14.1-inch active-matrix screen and a lithium ion battery that lasted over 8.5 hours in testing. But these features don't come cheap, accounting for much of the $5999 price.

In addition to its cost, the Ultra's so-so speed hurt its overall rating. This super-thin PMMX-166 notebook, with 32MB of RAM and a 512KB secondary cache, earned a PC WorldBench score of 210, about average for its class.

The Ultra comes with a fairly sturdy case. Although the touchpad is jumpy, an extra-large wrist rest can accommodate the most ham-handed user. You get a three-year warranty, and the documentation is good. We have no reader data on Digital notebooks' service and reliability. In our anonymous calls to the company's tech support staff, we didn't have to wait long to get advice—but it was often wrong.

The **HP OmniBook 3000** also made a strong run for the Top 10. Its PMMX-233 CPU, supported by 32MB of RAM, delivered an impressive PC WorldBench score of 229. Nice touches include a battery-charge indicator in plain view above the keyboard, and sturdy port covers. Also noteworthy is a modular bay that can hold either an optional internal Zip drive or a second battery to prolong the unit's nearly 3.5 hours of unplugged life. HP's three-year parts-and-labor warranty for this portable exceeds what most vendors offer.

But a $4473 price—steep, particularly for a machine that doesn't include a modem—helped keep this notebook off the power chart. The machine also had several annoying traits: The screen display is shifted a little left of center, the backspace key is undersize and easy for your finger to miss, and the CD-ROM and floppy drives must jockey for the same bay. We don't currently have enough feedback from our readers to judge the quality of HP's technical support.

PORTABLE DVD

IMAGINE YOU'RE on a long flight, and instead of having to watch a bad flick on the grainy cabin screen you can pop a movie into your notebook's DVD drive. When will you be able to avail yourself of such an indulgence?

In March, we'll report on our tests of the first DVD-ROM–equipped notebooks, including the **Toshiba Tecra 750DVD** and the **Panasonic CF-63**. But before you head out to buy a DVD notebook, keep a few things in mind. Vendors are adding DVD drives, which cost about $400, to their top-of-the-line systems. The Toshiba, for instance, is priced at $5799.

You should also be aware that some vendors are using first-generation DVD drives, which read CD-ROM and DVD-ROM discs more slowly than second-generation devices do. The first-generation drives also cannot read either CD-Recordable or CD-Rewritable media.

With DVD drives, the extensive decoding of video and audio signals places a huge drain on the battery. Will you be able to get through a Hollywood movie on one charge? And will the video be laser disc–quality? Stay tuned for our reviews. ■

Beyond the Top 10: Online

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 10 Notebook PCs chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **Fujitsu LifeBook 565Tx¶**
- **Gateway 2000 Solo 9100**
- **Hitachi VisionBook Elite**
- **MicroExpress NP8166**
- **Micron Transport VLX**
- **Toshiba Tecra 520CDT**

MEMORY

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MODEL	MEMORY	PRICE
Advantage 610, 810, 816	4Meg-8Meg-16Meg-32Meg-64Meg	30-55-95-175-365
Advantage Adventure 4000	4Meg-16Meg	30-95
Advantage Adventure 6000	4Meg-8Meg-16Meg 32Meg-64Meg	30-55-95-175-385
Advantage Adventure 8000	4Meg-8Meg-16Meg-32Meg	30-55-95-175
Advantega Pro 486 SX33,SX25	4Meg-8Meg-16Meg-32Meg	30-55-95-175
Bravo LC, 5100,5133,5166 (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-175
Bravo MS, 5100,133,166 (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-175
Bravo MS-T 6150 (pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-175
Manhattan G, V (pairs)	8Meg-16Meg-32Meg	55-95-175
Premmia 4-33,4-50,MTE 433 (pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-175
Premmia 4-660,SE 4-33-,4-66 (pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-175
Premmia LX P-60, MX 4-66,P75	4Meg-8Meg-16Meg-32Meg	30-55-95-175

IBM MEMORY

Aptiva 300,500 Series, 700 Series (pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-185
Aptiva A Series (pairs), C Series (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-185
Aptiva M Series	4Meg-8Meg-16Meg-32Meg	30-55-95-185
PC 330 Models 6571-6576, 6577 (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-185
PC 340 (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-185
PC 350 Models 6581-6585, 6586 (pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-185
PC 350 Model 6587 (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-55-95-185
PC 360	4Meg-8Meg-16Meg-32Meg	30-55-95-185
PC 730 Models 6875-6876 (pairs)	4Meg-8Meg-16Meg-32Meg	30-50-90-170
PC 730 Model 6877, 6887 (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-50-90-170
PC 750 Models 6885-6886 (pairs),	4Meg-8Meg-16Meg-32Meg	30-50-90-170
PC Server 310 (pairs)	4Meg-8Meg-16Meg-32Meg	30-50-90-170
PC server 500 (ECC,pairs)	4Meg-8Meg-16Meg-32Meg	55-90-165-295
P-S 1,30 Pin Simms	1-Meg-4Meg	15-30
P-S 1,72 Pin Simms	4Meg-8Meg-16Meg-32Meg	35-59-95-195
P-S 2,55SX,65SX	4Meg	40
P-S 2,53,53LS,56,57	4Meg-8Meg	40-65
P-S 2,95XP (ECC,pairs)	4Meg-8Meg-16Meg-32Meg	55-90-165-295
P-S Server,95,195,295 (ECC,pairs)	4Meg-8Meg-16Meg-32Meg	55-90-165-295

IBM NOTEBOOK MEMORY

Thinkpad 350,353, PS Note 2618	4 Meg-8Meg-16Meg	50-65-100
Thinkpad 300	2Meg-8Meg	5-140
PS2 L40SX	2Meg-4Meg-8Meg	40-50-99
PS2 NOTE 182/2141N82	2Meg-4Meg-8Meg	40-50-99
PS2 N33 SX	2Meg-4Meg	40-50
Thinkpad 820, 850 Power Series	4 Meg-8Meg-16Meg-32Meg	99-145-175-318
Thinkpad 345,355, C, CE	4 Meg-8Meg-16Meg	60-90-125
Thinkpad 340	4 Meg-8Meg	40-80
Thinkpad 365C,CS,CD,E,ED	4Meg-16Meg	40-120
Thinkpad 365X,365XD	8Meg-16Meg-32Meg	65-120-265
Thinkpad 500	4Meg-8Meg	65-85
Thinkpad 510CS	8Meg-16Meg-32Meg	65-85-135
Thinkpad 560	8Meg-16Meg-32Meg	65-115-265
Thinkpad 700,720	4Meg-8Meg	99-145
Thinkpad 701,701C	4Meg-8Meg-16Meg-32Meg	CALL
Thinkpad 730T,TE	4Meg-8Meg-16Meg	65-90-125
Thinkpad 750, C, CS, P	4Meg-8Meg-16Meg-32Meg	99-145-175-320
Thinkpad 755C,CE,CD,CS	4Meg-8Meg-16Meg-32Meg	60-90-125-275
Thinkpad 760C,CD,L,D,	8Meg-16Meg-32Meg	80-135-299
Thinkpad 760E,ED,EL,ELD	8Meg-16Meg-32Meg	65-115-265

COMPAQ MEMORY

Deskpro 486-25,33L,50L	2Meg-8Meg-32Meg	75-115-245
Deskpro 3-25N,33l,4-25lS,66l	2Meg-4Meg-8Meg	30-55-75
Deskpro 386,486 M Series	2Meg-4Meg-8Meg	30-55-75
Deskpro M Series Expansion Board	OK (no memory)	110
Deskpro 450,4100,590,5100,5133	4Meg-8Meg-16Meg-32Meg	30-69-120-210
Deskpro 575,5120,5133,5150,5160 (EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-69-120-210
Deskpro 2000,4000,6000 Series EDO,pairs)	4Meg-8Meg-16Meg-32Meg	30-50-90-169
Deskpro 5-60M,5-66M,XE560 (quads)	4Meg-8Meg-16Meg-32Meg	30-69-115-399
Deskpro XL (pairs)	4Meg-8Meg-16Meg-32Meg	35-60-105-215
Deskpro XL 6150,6200 (ECC,pairs)	8Meg-16-Meg-32Meg-64Meg-128Meg	CALL
Presario 510,520,524,660,720,724,860	4Meg-8Meg-16Meg-32Meg	30-55-95-185
Presario 920,924,954,974,978,992	4Meg-8Meg-16Meg-32Meg	30-55-95-185
Presario 833,850,860,866	4Meg-8Meg-16Meg-32Meg	40-65-110-220
Presario 5528,7110,7152	4Meg-8Meg-16Meg-32Meg	35-55-95-185
Presario 7170,7180,9536,9546,9548,9564 (pairs)	4Meg-8Meg-16Meg-32Meg	35-55-95-185
Presario 9232,9234,9240,9250,9642,9660 (pairs)	4Meg-8Meg-16Meg-32Meg	40-65-110-220
Proliant 1000 5-60,2000,R,4000,R (quads)	4Meg-8Meg-16Meg-32Meg	35-60-105-215
Proliant 1500,1500R (pairs)	4Meg-8Meg-16Meg-32Meg	35-60-105-215
Proliant 4500,4500R (quads)	8Meg-16Meg-32Meg-64Meg	65-115-200-420
Proliant 5000,5000R (pairs)	32Meg-64Meg-128Meg-256Meg	CALL
Prolinea 4-25S,4-33,4-66	2Meg-4Meg-8Meg	30-55-75
Prolinea (enhanced),MT	4Meg-8meg-16Meg-32Meg	35-60-105-215
Prolinea 575,590,5100,5120,5133 (pairs)	4Meg-8Meg-16Meg-32Meg	35-55-95-185
Prolinea 5100,5120,5133,5150,5166 (EDO pairs)	4Meg-8Meg-16Meg-32Meg	35-55-95-185
Prolinea 575E,100E,120E,575MX (pairs)	4Meg-8Meg-16Meg-32Meg	35-55-95-185
Prolinea 590MX, 5120MX, 6150E, 6180E (pairs)	4Meg-8Meg-16Meg-32Meg	35-55-95-185
Prosignia 300,5-75,5-90,5-120,5-150 (pairs)	4Meg-8Meg-16Meg-32Meg	35-60-105-215
Prosignia 500 5-90,5-129,5-150 (pairs)	4Meg-8Meg-16Meg-32Meg	35-60-105-215

COMPAQ NOTEBOOK MEMORY

Armada 1120,T	8Meg-16Meg-32Meg	65-130-310
Armada 1130, 1130T, 1500	8Meg-16Meg-32Meg	69-120-269
Armada 4100,4110,4120,4130	8Meg-16Meg-32Meg Kit	70-120-240
Concerto 4-25,433	4Meg-8Meg-16Meg	59-79-129
Contura 4-25,C,CX	4Meg-8Meg-16Meg	45-75-120
Contura 3/20, 3/25, 3/25C	4Meg-8Meg	55-90
Contura 400C,400CX,410C,410CX	4Meg-8Meg-16Meg	60-85-135
Contura 420C,420CX,430C,430CX	4Meg-8Meg-16Meg-24Meg	60-85-135-199
Contura Aero 4-25,4-33	4Meg-8Meg-16Meg	60-80-130
Presario 1010, 1020, 1030, 1070, 1080	8Meg-16Meg	65-130

TOSHIBA NOTEBOOK MEMORY

LTE 286	4Meg	65
LTE 386S/20	2Meg-4Meg-8Meg-16Meg	75-95-115-159
LTE Lite/20 (386)	4Meg	65
LTE 5000,5100,5200,5300	8Meg-16Meg-32Meg-64Meg Kit	75-120-230-445
LTE Elite 4140C,CX,4-75CX	4Meg-8Meg-16Meg-24Meg	60-80-130-205
DynaPad T100X	4Meg	85
DynaBook SS450/475	4Meg-8Meg-16Meg-24Meg	50-75-125-180
DynaBook V486V	4Meg-8Meg-16Meg	60-85-135
DynaBook R575, S575	4Meg-8Meg-16Meg-24Meg	85-135-240
Libratto 20, 30	8Meg-12Meg	105-135

TOSHIBA NOTEBOOK MEMORY

Libretto 50	8Meg-16Meg	99-159
Protege 650CT, 660CDT	8Meg-16Meg-32Meg-64Meg	75-125-225-525
Tecra 500, 510 CDS/CDT	8Meg-16Meg-32Meg-64Meg	75-125-240-350
Tecra 700 (SDRAM)	8Meg-16Meg-32Meg	105-169-240
Tecra 710, 720, 730, CDT	8Meg-16Meg-32Meg-64Meg-128Meg	80-135-240-570-1155
T2000SXE-2200SX-T1800, 1850, C	4Meg-8Meg	75-115
T2100, 2105, 2155, 2110, 2115	4Meg-8Meg-16Meg-24Meg	50-75-125-180
T4500, C, T4600, T4700,T1900, T1910, T1950 (3 3v)	4Meg-8Meg-16Meg	60-80-135
T4850,T4850CT, T4900, T4900CT	4Meg-8Meg-16Meg-32Meg	60-80-135-260
T3400CT, T2400, T3600	4Meg-8Meg-16Meg	40-65-130
T100, 105, 110, 115, 400, 405, 410, 415, 420, 425	8Meg-16Meg-32Meg	80-135-240
T400CS, 400CDT, 105EDO, 600, 610, CT EDO	8Meg-16Meg-32Meg	80-135-240

NOTEBOOK MEMORY

ACERNote 730C, 735C, 760C, 760CX, 780CX	4Meg-8Meg	45-70
ACERNote 760i, 763, 765, 782, 784, 786	4Meg-8Meg-16Meg	45-70-115
ACERNote Light 350, 352, 355	4Meg-8Meg-16Meg	69-125-250
ACERNote Light 350P, 510, 810, 372, 373, 374	8Meg-16Meg-32Meg	69-120-265
ACERNote 970CX, 370/C370CX	4Meg-8Meg-16Meg	40-65-115
ACERNote Light 356, 358, 359, 361(pairs)	4Meg-8Meg-16Meg	35-65-125
ACERNote Pro 950, 954, 955, 957, 959(pairs)	4Meg-8Meg-16Meg	35-60-105
AST Ascentia A40, A41, A42	8Meg-16Meg-32Meg	65-120-265
AST Ascentia P30, P50	8Meg-16Meg-32Meg	79-145-299
AST Ascentia J10, J30, J50 (install pairs)	8Meg-16Meg-32Meg	65-105-CALL
AST Ascentia 900N, 800N, 810, 910	4Meg-8Meg-16Meg	70-85-130
ASTBravo & Explorer	4Meg-16Meg	55-110
AST Prem Exec 386SX-20-25-25L	4Meg	50
AST Power Exec 3-25, 425EL, 425SL, 4-33SL	4Meg-16Meg	65-140
AT & T Globalyst 130	4Meg-8Meg-16Meg	40-65-135
AT & T Globalyst 250/250P	4Meg-8Meg-16Meg-32Meg	85-120-155-265
AT & T Globalyst 200 Safari 351	8Meg-16Meg	105-189
Cannon Innova Book 1100P, 120T, P-75, P-90	4Meg-8Meg-16Meg	40-69-120
Cannon Innova Book 1B300P 75/540C	8Meg-16Meg	65-115
Note Jet 486	4Meg-8Meg	45-69
Note Jet III (pairs)	4Meg-8Meg-16Meg	45-69-120
Cannon Innova Book 150, 175	4Meg-16Meg	65-135
Cannon Innova Book 200LS	4Meg-8Meg-16Meg-24Meg	65-95-215-345
Cannon Innova Book 350CD, 360, 475	8Meg-16Meg	65-115
Cannon Innova 486-10	4Meg-16Meg	75-215
CTX EZ Book 5x86 Pent., 500 Pent., 600 Pent. Series	4Meg-8Meg-16Meg	40-65-115
CTX EZ Book 700 Pent., CTX, X953NS	8Meg-16Meg-32Meg	65-120-245
DEC 325SL, 425SLC, 425SL, 433	4Meg-8Meg-16Meg	69-85-115
DEC 425SE, 433SE	4Meg-16Meg	55-110
DEC 425SL, Premium, 433 SLC	4Meg-16Meg	69-140
DEC Ultra HiNote II 5000 Series	4Meg-8Meg-16Meg-32Meg	40-69-120-320
DEC HiNote, Ultra HiNote	4Meg-8Meg-16Meg	40-80-115
DEC HiNote VP	8Meg-16Meg-32Meg	65-125-245
Epson ActionNote 500C	4Meg	45
Epson ActionNote 910	4Meg-8Meg-16Meg	50-80-165
Epson ActionNote 650, 650C, 660C, 660CX	4Meg-8Meg-16Meg	55-85-125
Epson ActionNote 700, 700C, 700CX	4Meg-16Meg	75-185
Epson ActionNote 880, 866C, 890	4Meg-8Meg-16Meg	45-75-165
Epson ActionNote 4LC-25, 4LC-33, 4SLC-2-50, 400	6Meg	60
Everex Tempo LX, LX20, Carrier	2Meg	85
Everex StepNote 486	4Meg-8Meg	40-115
Fujitsu Monte Carlo, Milan, Montego	8Meg-16Meg-32Meg	65-120-265
FMV -Biblo 400 Series	4Meg-8Meg-16Meg	40-70-120
Gateway 2000 Colorbook 4-33	4Meg-16Meg	65-175
Gateway 2000 Nomad 425 DXL-SXL	4Meg-16Meg	155-755
Gateway 2000 486 Handbook or Liberty	4Meg-16Meg	55-165
Hitachi C-Series	8Meg-16Meg-32 Meg	80-145-325
Hitachi E-Series	8Meg-16Meg	80-145
Hitachi M-Series	8Meg-16Meg	100-150
HP Omnibook 300, 480, 425	4Meg	70
HP Omnibook 430	4Meg	69
HP Omnibook 530, 600	4Meg-8Meg-12Meg	60-85-115
HP Omnibook 800CS, CT	8Meg-16Meg-32Meg	85-145-299
HP Omnibook 430	4Meg	69
HP Omnibook 4000	4Meg-8Meg-16Meg	65-89-139
HP Omnibook 5000	8Meg-16Meg-32Meg	85-135-225
HP Omnibook 6000	4Meg-8Meg	65-110
HP Omnibook 800CS, CT	8Meg-16Meg-32Meg	85-145-299
HP Palmtop 200LX	4Meg-8Meg-12Meg-16Meg-20Meg	125-169-210-255-299
Leading Edge Aviva 2000	4Meg-16Meg	65-175
Lexmark SE10	4Meg	65
Magnavox Metalis	4Meg	115
Micron Transport Pentium	8Meg-16Meg	115-215
Midwest Micro Elite, Soundbook, Soundbook CD	4Meg-8Meg-16Meg	75-115-195
Midwest Micro Elite or Soundbook Plus, Soundbook II, IIP	4Meg-8Meg-16Meg	75-115-195
NCR Safari 3180, 3181	4Meg-8Meg-16 Meg	85-119-155
NEC ProSpeed 486	4Meg	40
NEC Ultralite Versa, E, V, MP	4Meg-8Meg-16Meg-32Meg	85-119-155-265
NEC Versa, S, Versa 2000 & 2000D, 500	4Meg-8Meg-16Meg	40-75-115
NEC Versa 2530	8Meg-16Meg	60-115
NEC Versa 2600	32Meg	240
NEC Versa 4000, 4050-4080	4Meg-8Meg-16Meg-32Meg	85-119-155-265
NEC Versa 6000	8Meg-16Meg-32Meg-64 Meg	90-145-245-495
NEC Versa 6200	16Meg-32Meg-64 Meg	119-280-525
Olivetti Echos P75-P1335 (pairs)	4Meg-8Meg-16Meg	35-60-105
Packard Bell Statesman	2Meg-8Meg	40-60
Panasonic CF-V21P, CF-V41	4Meg-8 Meg-16Meg	80-105-155
Panasonic CF-580, CFV21PSX	4Meg16Meg	65-149
Samsung Sens 500 Series	8Meg-16Meg-32Meg	65-120-265
Samsung Sens 810	8Meg-16Meg-32Meg	CALL
Sanyo 17-18 N8	2Meg	85
Sharp 400 Series	8Meg-16Meg-32Meg	80-130-255
Sharp 3030, 3070	8Meg-16Meg	79-145
Sharp 6781, 6881, 6785, 6700, 6800, 6741	2Meg-4Meg	45-60
Sharp 8150, 8650, 8660, 7700, 7760	4Meg-16Meg	60-130
Sharp 8700, 8800, 8900	4Meg-8Meg-16Meg	65-90-140
Sharp 3010, 3020, 3050, 3060	4Meg-8Meg-16Meg	40-65-115
Sharp 9000, 9030	8Meg-16Meg-32Meg	85-130-255
Sharp 9040, 9070 (pairs)	4Meg-8Meg-16Meg	40-65-115
TI Travel Mate 3000	2Meg	50
TI 4000, 4000E, 4000M	4Meg-16Meg	140-715
TI 5000, 5100, 5200, 5300	8Meg-16Meg	85-140
TI 6020, 6030, 6050, 6160	8Meg-16Meg-32Meg	65-120-310
TI Extensa, 450, 450T, 455, 455T, 570	4Meg-8Meg-16Meg	40-65-115
TI Extensa, 550, 555, 560, 560 (pairs)	4Meg-8Meg-16Meg	35-60-110
TI Extensa 600 Series, 900 Series	8Meg-16Meg-32Meg	65-120-310
Winbook XP	16Meg-32Meg	185-335
Winbook FX	8Meg-16Meg	80-145
Zenith Master Sport SL, SLE, 600, 620, 625NL	2Meg	45
Zenith Z-Note 425LN, LNC, LNP	4Meg	70
Zenith Z-Note MX	4Meg-8Meg-16Meg	60-90-150
Zenith Z-Note GT	8Meg-16Meg-32 Meg	60-115-210
Zenith Z-Note Flex 486, Flex Pentium	4Meg-8Meg-16Meg	40-69-119
Zenith Z-Star 4-33	2Meg-8Meg	40-70
Zenith Z-Star EX	4Meg-8Meg-16Meg	40-65-115

S-DRAM DIMMS
168 PIN - 3.3 VOLT UNBUFFERED

2 X 64 - 10 - 16MB $40
4 X 64 - 10 - 32MB 75
8 X 64 - 10 - 64MB 260
16 X 64 - 10 - 64MB 550

HARD DRIVES
CALL FOR EXTERNAL PRICES ON SCSI, WIDE & NOTEBOOK DRIVES

SIMMS — LIFETIME WARRANTY

30 PIN NON-PARITY/8 BIT	
1MB X 8-60NS SIMM	$10
1MB X 8-70NS SIMM	10
4MB X 8-80NS SIMM	25
4MB X 8-70NS SIMM	25
4MB X 8-60NS SIMM	25
30 PIN 9 BIT SIPPS	
1MB X 9-100NS SIPP	20
1MB X 9-80NS SIPP	20
1MB X 9-70NS SIPP	20
1MB X 9-60NS SIPP	20
256K X 9-70NS SIPP	10
30 PIN PARITY/9-BIT	
4MB X 9-70NS SIMM 3 CHIP	25
4MB X 9-60NS SIMM 3 CHIP	25
4MB X9-60NS SIMM 3 CHIP LOGIC	20
4MB X9-70NS SIMM 3 CHIP LOGIC	20
4MB X 9-80NS SIMM 9 CHIP	25
4MB X 9-70NS SIMM 9 CHIP	25
4MB X 9-60NS SIMM 9 CHIP	25
1MB X 9-100NS 9 CHIP SIMM	10
1MB X 9-80NS 3 CHIP SIMM	10
1MB X 9-80NS 9 CHIP SIMM	10
1MB X 9-70NS 3 CHIP SIMM	15
1MB X 9-70NS 9 CHIP SIMM	15
1MB X 9-60NS 3 CHIP SIMM	15
1MB X 9-60NS 9 CHIP SIMM	15
16MB X 9-70NS/60NS SIMM	100
256K X 9-80NS/70NS SIMM	10
72 PIN MEMORY	
256 X 36-1MB-70NS	15
512 X 36-2MB-70NS	20
512 X 36-2MB-80NS	20
1X36-4MB-70NS/60NS LOGIC	20
1X36-4MB-70NS/60NS MAJOR	25
2X36-8MB-70NS/60NS LOGIC	30
2X36-8MB-70NS/60NS MAJOR	35
4X36-16MB-70NS/60NS LOGIC	40
4X36-16MB-70NS/60NS MAJOR	50
8X36-32MB-70NS LOGIC	85
8X36-32MB-60NS LOGIC	85
8X36-32MB-70NS MAJOR	100
8X36-32MB-60NS MAJOR	100
16X36-64MB-70NS/60NS	295
1 X 32-4MB-70NS/60NS	12
2 X 32-8MB-70NS/60NS	24
4 X 32-16MB-70NS/60NS	31
8 X 32-32MB-70NS/60NS	75
16 X 32-64MB-70NS/60NS	250
EDO MEMORY	
4MB/8MB EDO	12/24
16MB/32MB EDO	35/70
PIPELINE CACHE	
256K/512K	20/40

Quantum

IDE DRIVES				INT
8F4335A	4.3GB	14MS	IDE	$195
FB6510A	6.4GB	14MS	IDE	270
ULTRA IDE DRIVES				
FB31620A	1.6GB	10MS	IDE	150
FB32160A	2.1GB	10MS	IDE	180
F833240A	3.2GB	10MS	IDE	190
BF4000A	4.0GB	12MS	IDE	220
FB34320A	4.3GB	10MS	IDE	245
8F6000A	6.0GB	12MS	IDE	300
FB36480A	6.4GB	10MS	IDE	325
8F8000A	8.0GB	12MS	IDE	340
8F12000A	12.0GB	12MS	IDE	425
ULTRA SCSI DRIVES				
F832160S	2.1GB	10MS	USCSI	195
VK32275S	2.2GB	8MS	USCSI	335
FB33240S	3.2GB	10MS	USCSI	260
F834320S	4.3GB	10MS	USCSI	305
VK34550S	4.5GB	8MS	USCSI	460
XP34550S	4.5GB	8MS	USCSI	520
F836480S	6.4GB	10MS	USCSI	385
XP39100S	9.1GB	8MS	USCSI	795
ULTRA WIDE SCSI DRIVES				
VK32275W	2.2GB	8MS	UWIDE	335
XP32275W	2.2GB	8MS	UWIDE	295
VK34550W	4.5GB	8MS	UWIDE	460
XP34550W	4.5GB	8MS	UWIDE	520
XP39100W	9.1GB	8MS	UWIDE	795

FUJITSU

ULTRA IDE DRIVES				INT
MPA3026U	2.6GB	10MS	U-IDE	165
MPA3035U	3.5GB	10MS	U-IDE	185
MPA3043U	4.3GB	10MS	U-IDE	235
MPA3052U	5.2GB	10MS	U-IDE	265
MPA3065U	6.5GB	10MS	U-IDE	305
ULTRA SCSI DRIVES				
M2949S	9.1GB	8MS	SCSI	795
ULTRA WIDE SCSI DRIVES				
M2954W	4.4GB	8MS	WIDE	515
M2949W	9.1GB	8MS	WIDE	815

WESTERN DIGITAL

IDE DRIVES				INT
AC11200	1.2GB	11MS	IDE	$150
AC21600	1.6GB	12MS	IDE	155
AC22000	2.0GB	11MS	IDE	175
AC22500	2.5GB	11MS	IDE	185
AC33100	3.1GB	12MS	IDE	205
AC34000	4.0GB	11.5MS	IDE	230
ULTRA IDE DRIVES				
AC34300	4.3GB	11MS	IDE	240
AC35100	5.1GB	12MS	IDE	375
AC36400	5.1GB	12MS	IDE	295

Seagate

IDE DRIVES				INT
ST31277A	1.2GB	12.5MS	IDE	120
ST31720A	1.7GB	12MS	IDE	135
ST32531A	2.5GB	12MS	IDE	175
ULTRA IDE DRIVES				INT
ST32122A	2.1GB	12MS	IDE	165
ST33232A	3.2GB	12MS	IDE	195
ST34342A	4.3GB	12MS	IDE	235
ST36451A	6.4GB	9.5MS	IDE	320
ST38641A	8.6GB	10MS	IDE	415
ULTRA SCSI DRIVES				
ST52160N	2.1GB	11MS	USCSI	225
ST32272N	2.1GB	8MS	USCSI	330
ST34555N	4.5GB	8MS	USCSI	345
ST34572N	4.5GB	8MS	USCSI	485
ST34501N	4.5GB	7.5MS	USCSI	595
ST19171N	9.1GB	8MS	USCSI	825
ST19101N	9.1GB	8MS	USCSI	995
ST423451N	23.2GB	13MS	USCSI	1665
ULTRA WIDE SCSI DRIVES				
ST32272W	2.1GB	8MS	UWIDE	365
ST34555W	4.5GB	8MS	UWIDE	365
ST34572W	4.5GB	8MS	UWIDE	520
ST34501W	4.5GB	7.5MS	UWIDE	625
ST19171W	9.1GB	8MS	UWIDE	855
ST19101W	9.1GB	8MS	UWIDE	1025
ST423451W	23.2GB	13MS	UWIDE	1685
ULTRA WIDE DIFFERENTIAL				
ST32272WD	2.1GB	8MS	UWIDE DIFF	420
ST34572WD	4.5GB	8MS	UWIDE DIFF	605
ST34501WD	4.5GB	7.5MS	UWIDE DIFF	685
ST19171WD	9.1GB	8MS	UWIDE DIFF	959
ST423451WD	23.2GB	13MS	UWIDE DIFF	1755
SCA-Single Connector Attachment				
ST32272WC	2.1GB	8MS		375
ST34572WC	4.5GB	8MS		555
ST34501WC	4.5GB	7.5MS		645
ST19171WC	9.1GB	8MS		905
ST19101WC	9.1GB	8MS		1045
FC-AL Fibre Channel-Arbitrated Loop				
ST34501FC	4.5GB	7.5MS		685
ST19171FC	9.1GB	8MS		945
ST19101FC	9.1GB	8MS		1085

Maxtor

IDE DRIVES				INT
M832400	3.2GB	9.7MS	IDE	$190
M843200	4.3GB	9.7MS	IDE	235
M852500	5.2GB	10MS	IDE	275
MB64800	6.4GB	9.7MS	IDE	340
MB70000	7.0GB	10MS	IDE	355
MB51200	8.4GB	9.7MS	IDE	405

CD ROM DRIVES
CALL FOR EXTERNAL PRICES

TOSHIBA

6102B 24 Speed IDE Internal $89

NEC

CDR1600A 24 Speed IDE Internal $85
CDR1610A 16 Speed SCSI Internal 115
CDR2400A 24 Speed SCSI Internal 149

CD CHANGERS

CDR251 6X IDE W/4CD Changer 79
CDR4300 8X IDE W/4CD Changer 89

MITSUMI

FX1200 16 Speed IDE Internal $82
FX1600 24 Speed IDE Internal 88

NOTEBOOK DRIVES

TOSHIBA

NOTEBOOK DRIVES/2.5"

MK1002	1.0GB	13MS	IDE	$199
MK1403	1.4GB	13MS	IDE	215
MK2103	2.1GB	13MS	IDE	260
MK3303	3.0GB	13MS	IDE	425

IBM

IBM THINKPAD 750 & 760 SERIES				
QED/TP756-3.0CD	3.1GB	13MS	IDE	$1095
QED/TP756-2100	2.1GB	13MS	IDE	825
QED/TP756-1600	1.6GB	13MS	IDE	665
QED/TP756-1440	1.4GB	13MS	IDE	585
IBM THINKPAD 760C,CD,E,ED,EL,ELD,L,LD				
QED/TP756-3.0CD	3.1GB	13MS	IDE	$1095
QED/TP760-2100	2.1GB	13MS	IDE	825
QED/TP756-1600	1.6GB	13MS	IDE	665
QED/TP760-1440	1.4GB	13MS	IDE	585
QED/ULTRA-DRV	2nd HDD Ultra Bay Adapt			75
IBM THINKPAD 350, 360, 750, 755				
QED/TP750-2100	2.1GB	13MS	IDE	775
QED/TP750-1440e	1.4GB	13MS	IDE	540
IBM THINKPAD 701 C/CS (Butterfly)				
QED/TP701-2100	2.1GB	13MS	IDE	775
QED/TP701-1600	1.6GB	13MS	IDE	625
QED/TP701-1440	1.4GB	13MS	IDE	540

NEC

VERSA P, M, V, E, VersaBay II				
QED/VERSA-3000	3.1GB	13MS	IDE	$918
QED/VERSA-2100	2.1GB	13MS	IDE	685
QED/VERSA-1440	1.4GB	13MS	IDE	490
VERSA 6000, 4000 & 2000 SERIES				
QED/V246-2100	3.1GB	13MS	IDE	685
QED/V246-1600	2.1GB	13MS	IDE	655
QED/V246-1440	1.6GB	13MS	IDE	625

TAPE BACKUPS

HEWLETT PACKARD

1534 2.0GB TAPE INT/EXT $579-679
1536 4GB TAPE INT/EXT 609-719
1533AI 4-8GB TAPE DDS2 INTERNAL........849
1533AI 4-8GB TAPE DDS2 EXTERNAL.....1099
C1599 4-8GB TAPE DDS2 INTERNAL 859
C1599 4-8GB TAPE DDS2 EXTERNAL......1059
C1554 12-24GB TAPE DDS3 INTERNAL.....1249
C1554 12-24GB TAPE DDS3 EXTERNAL.....1549
C564BA 72-144GB TAPE DDS3 INTERNAL ...2779
C564BA 72-144GB TAPE DDS3 EXTERNAL...3079
4MM 90MT DAT CART (1/5 PK) 12-55
4MM 120MT DAT CART (1/5PAK)35-170
3.5"-5.25" CONVERSION KIT 1533,1536,1534....39

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B700LT 5-10GB TAPE INT/EXT.......1050-1250
B505XL 7-14GB TAPE INT/EXT.......1998-2298
B700 7-14GB TAPE INT/EXT.........999-1199
B900 20-40GB TAPE BMM INT/EXT3769-4069
10H 70-140GB TAPE BMM INT....4239-4539
BMM TAPES..18

Seagate

4324 2-4GB DAT-DC INT/EXT.......$669-869
4326 4-8GB DDS-2 DAT INT/EXT....739-939
224000N 12-24GB DDS-3 DAT INT/EXT1059-1359
C4586NP 4B-96GB DDS-2 DAT INT/EXT1879-2179
4MM 90MT DAT CART (1/5 PK) 12-55
4MM 120MT DAT CART (1/5PAK) ...35-170

DELL DESKTOP MEMORY

MODEL	MODULE/KITS	PRICE
PowerLine Workstations (all)	8-16-32MB	80-145-270
PowerEdge SP (all models)	8-16-32-64MB	80-145-270-425
PowerEdge XE Pentium (all mdls)	16-32-64MB	120-210-425
OmniPlex 560/ME,566/ME,590/ME		
PowerEdge XE 450,466,433,433s	8-16-32-64MB	30-45-90-180
OmniPlex ME Series		
System 433TE, System 425TE	8-16MB	80-145
OptiPlex DGX Series (Pentium)	8-16-32-64MB	70-120-210-425
OptiPlex G & GX Series (Pentium)	8-16-32-64MB	60-115-230-420
Low Profile Power Desktop (all)	4-16MB	30-120
Power Desktop (all models)		
OptiPlex 4100/e,466/e,450/e,433/3	4-16MB	30-90
OptiPlex V Series (all models)		
Performance T; L; M (all models)		
Dimension & Dimension XPS Series	4-8-16-32MB	25-39-69-129
(Pentium) * Installed in pairs	4-8-16MB EDO	20-35-65

DELL NOTEBOOK MEMORY

Latitude XPi (Pent), XP (486)	4-8-16MB	40-70-120
Latitude LX (486)	4-8-16MB	55-95-130
Latitude 433m,mc,450mc, mcx	4-8-16MB	55-95-130
Latitude 433; 433c; 433cx	4-16MB	55-115

DIGITAL DESKTOP MEMORY

DECpc MT,MTE(all models)	4-16MB	40-115
Prioris MTE (all models)		
DECpc LP;LPx;LPx+(all models)		
Venturis Series (Pent)	4-8-16-32MB	30-55-95-185
* Installed in pairs		
Celebris Series (Pentium)	4-8-16-32MB	30-55-95-185
* Installed In pairs		
Celebris XL Series (Pentium)	8-16-32-64MB	Call
Celebris GL & GLST Series	4-8-16-32MB EDO	20-35-65-125
(Pentium) * Installed in pairs		
Venturis 560,4100,466,450s2,433	4-8-16-32MB	30-55-95-185

DIGITAL NOTEBOOK MEMORY

HiNote VP (Pentium)	8-16-32-64MB EDD	69-125-250
HiNote Ultra II (Pentium)	4-8-16-32MB	40-70-120
HiNote Ultra (all models)	4-8-16-32MB	40-70-120
HiNote 486, DX4/75,DX2/50,SX/33	4-8-16-32MB	40-70-120
HiNote VP (Pentium)	8MB EDO	169

GATEWAY DESKTOP MEMORY

Destination Big Screen PCi's	4-8-16-32MB EDO	20-35-65-125
P5-75,120,166,166XL,133,150		
Family PC, P5-75,100,120,133		

HEWLETT PACKARD MEMORY

Pavilion Series (Pentium)	4-8-16-32MB EDO	30-55-95-185
* Installed in pairs		
NetServer LF, LM, LM2, LC	4-8-18-32MB EDO	40-65-110-200
Vectra XP/60,VL2 Pent.,Vectra		
NetServer LE Series 486DX/33	4-8-16-32MB EDD	40-65-110-200
486SX/33, 486DX/66		
NetServer 4/33 LM		
Vectra VE/4 & XM3 Series	4-8-16-32MB EDO	30-50-90-175
* Installed in pairs(XM3 Series)		
Vectra VE/5,VL4 & XM4 Series	4-8-16-32MB EDO	20-35-65-125
* Installed in pairs		
Vectra XU 5/90, 90C(GX), 100	4-8-16-32MB	30-55-95-185
Vectra XM3, VL3		
Vectra M2,N2,XM2,(all models)	4-8-18-32MB	30-55-95-185
Vectra VL2 486 (all models)		
Vectra EM, ST Series (all models)	4-8-16MB	35-65-120
Vectra PC (all models) 512MB VRAM Kit, 8MB		45-65
Vectra 486 PC,	4-8MB Module	35-65
Vectra 486/33T, 486/25T 512MB VRAM Kit, 4-8MB		40-35-65
Vectra N, M, Ni (all models)	4-8-16-32MB	36-65-120
Vectra 486/66VL, 33VL, 25VL	4-8-16-32MB	36-65-120

MICRON DESKTOP MEMORY

Pro180 Magnum, 200 Magnum Plus	4-8-16-32MB	25-39-69-129
P133, P266 PowerServer SMP		
4100 PCI Magnum		
P150PCi Millenia, P166PCI Millenia+	4-8-16-32MB	20-35-65-125
P75, P100 PowerStation		
P100 Home MPC, P150 Home MPC Pro		

NEC DESKTOP MMEORY

Image Pentium (all models)	4-8-16-32MB	25-39-69-129
Image 4100m;4100es,466ex,450es;433es		
PowerMate Express/II (all models)		
PowerMate Express 486/50Te,66Te	4-16MB	40-110
PowerMate Express 4865X/25Te		
PowerMate Express 486/33e, 66e		
PowerMate V Series (486 & Pent.)	4-8-16-32MB	40-65-110-220
* Installed in pairs on Pentiums		
Power Mate Express 486/50e	4-16MB	40-110
Power Mate Express 486SX/20e,25e		
imSage 466, 433, 425	4-16MB	40-130
PowerMate 477es, 433es;425es		
Ready 466es; 433es;425es;		
PowerMate P60D, P60M	4-8-16-32MB	40-65-110-220
Ready P60M, 433, 425		
PowerMate 4100M; 466M; 466D		
PowerMate 466M		
Ready 4100M; 466m; 466D; 433D		
PowerMate 425, 433, 466	4-16MB	40-140

NEC NOTEBOOK MEMORY

UltraLite SL/25C, UltraLite III	2-4-8MB	85-125-199
UltraLite SL/20, UltraLite SL/20P	2-6MB	95-100
Versa M, P, V (all models)	4-8-16-32MB	85-119-155-265
Versa 4000,4050,4080,4200		
Versa S (all models), 500, 550	4-8-16MB	40-75-115
Versa 2000,2200C,2205,2400CD		
Versa 6000 (Pent) Credit Card	8-16-32-64MB	90-145-245-495

LASER PRINTER MEMORY

AMOUNT UPGRADED	OKBd	256k	1	2	3	3.5	4	5	6	8	16	32
Brother 630, 631,641,645	—	—	40	59	—	—	—	—	—	—	—	—
Brother HL-4, 4PS, 4V	—	—	70	85	—	—	125	—	—	—	—	—
Brother HL-6 Series	—	—	—	70	—	—	90	—	—	—	—	—
Brother HL-8 Series	—	—	80	100	—	—	—	—	—	—	—	—
Brother HL-10V, 10DV, 10PS	—	—	—	65	—	—	85	—	—	—	—	—
Brother HL-10H	—	—	20	—	—	—	35	—	—	55	—	—
Cannon LBP 860, 1260	—	—	—	—	—	—	40	—	—	—	115	225
Cannon LBP4, 4Lite, 4plus	—	—	115	155	—	—	—	—	—	—	—	—
Cannon LBP-8III, 8III Plus, R	—	—	125	165	185	—	—	—	—	—	—	—
Cannon LBP-8II, 8IIR, 8IIT,	—	—	—	85	—	—	130	—	—	—	—	—
Cannon LBP-4SX	—	—	70	85	—	—	—	—	—	—	—	—
Cannon LBP-8SX	—	—	80	100	—	—	—	—	—	—	—	—
Epson 6000, Action Laser	—	—	—	110	—	—	169	—	—	—	—	—
Epson Action Laser 1100	—	—	25	30	—	—	40	—	—	—	—	—
Epson Action Laser 1600	—	—	25	30	—	—	40	—	—	70	115	225
Epson Action Laser II	—	—	—	95	105	—	—	135	—	—	—	—
Epson 8000,1800, 4000, 4100, 4300	—	—	—	95	105	—	—	135	—	—	—	—
Epson 1000, 1500, 5000, 5200	—	—	—	40	—	—	—	—	—	—	—	—
Epson EPL-7000	—	—	75	95	110	—	—	—	—	—	—	—
HP 2, 2D~	—	—	—	59	—	—	79	—	—	—	—	—
HP3, 3D, 3P, 2P, 2P+	—	—	45	55	—	—	80	—	—	—	—	—
HP 4, 4M, 4SI, 4SIMX	—	—	25	30	—	—	40	—	—	70	—	—
HP 4P, 4PLUS, 4MPM 1600, 1600CM	—	—	25	30	—	—	40	—	—	70	115	175
HP4L	—	—	30	—	—	—	—	—	—	—	—	—
HP 3SI	—	—	25	30	—	—	40	—	—	70	115	—
HP 5P, 5MP, 4V, 4MV	—	—	25	30	—	—	40	—	—	70	115	—
HP Design Jet 200, 220	—	—	25	40	—	—	45	—	—	75	—	—
HP Design Jet 600, 650	—	—	—	—	—	—	40	—	—	70	—	—
HP Deskjet 500,500C,510,550,560	—	50	—	—	—	—	—	—	—	—	—	—
HP Deskjet 650C, 750C, 700	—	—	—	—	—	—	35	—	—	55	85	175
HP Laser Jet 6P, 6MP	—	—	20	30	—	—	35	—	—	55	85	—
HP Color Laser Jet 5, 5M	—	—	—	30	—	—	35	—	—	55	85	175
HP Copy Jet M	—	—	20	30	—	—	35	—	—	55	85	—
HP Deskjet 1200C, 1200C-P	—	—	30	40	—	—	45	—	—	80	—	—
HP Paintjet XL300	—	—	20	30	—	—	35	—	—	55	—	—
IBM Laser 4019, 4019E	—	—	65	85	—	110	—	—	—	—	—	—
IBM Laser 4029, 4037	—	—	25	35	—	—	55	—	—	—	—	—
IBM Laser 4039, 4079	—	—	—	30	—	—	40	—	—	70	—	—
Konica LP-3110, 3115	—	—	115	185	235	—	—	—	—	350	—	—
Kyocera F-800, 800A, 800T	—	—	95	115	—	—	155	—	—	—	—	—
Kyocera F-1000A	—	—	65	—	—	—	—	—	—	—	—	—
Kyocera F-1200S, 2000A, 3000A, 3300	—	—	89	110	—	—	155	—	—	—	—	—
Kyocera F-1500, 1800, 2000	—	—	40	—	—	—	—	—	—	—	—	—
Kyocera F-3500, 5500, 3400	—	—	25	30	—	—	40	—	—	—	—	—
Kyocera F-1550, FS-1550+	—	—	25	30	—	—	40	—	—	—	—	—
Kyocera FS-1600, FX1600+	—	—	25	30	—	—	40	—	—	70	115	225

LASER PRINTER MEMORY

AMOUNT UPGRADED	OKBd	256k	1	2	3	3.5	4	5	6	8	16	32
Kyocera FS-3600, FS-3600+	—	—	25	30	—	—	40	—	—	70	115	225
Lexmark Medley 4C, 4X, 4SX	—	—	Call	Call	Call	—	—	—	—	—	—	—
Lexmark Optra L, LX, R, RX	—	—	—	30	—	—	35	—	—	55	85	170
Lexmark Valuwriter 200,300,400,600	—	—	25	35	—	—	45	—	—	—	—	—
NEC 90, 290	—	—	—	125	—	—	—	—	—	—	—	—
NEC Silentwriter 95, 95fx, 97, 97fx	—	—	35	40	—	—	—	—	—	—	—	—
Oki 400	—	—	65	80	—	—	—	—	—	—	—	—
Oki 400E, 400EX, 410E, 410EX	—	—	85	100	—	—	135	—	—	—	—	—
Oki 810E, EX, 600E, EX, 610E, EX	—	—	85	100	—	—	135	—	—	—	—	—
Oki 800, 820	—	—	85	105	—	—	149	—	—	—	—	—
Okidata 830, 840	—	—	—	85	—	—	—	—	—	—	—	—
Okidata 1200, OL-1200EX	—	—	—	35	—	—	55	—	—	100	—	—
Okidata 2350, 2450	—	—	Call	Call	—	—	—	—	—	—	—	—
Packard Bell PB 9600	—	—	—	110	—	—	160	—	—	—	—	—
Panasonic 4420, 4450I	—	—	70	85	—	—	120	—	—	—	—	—
Panasonic 4410, 4430	—	—	70	85	—	—	120	—	—	—	—	—
Panasonic 4450	—	—	60	—	—	—	—	—	—	—	—	—
Panasonic 4400, 5400	—	—	45	50	—	—	65	—	—	—	—	—
Panasonic 4440, 5410, 6500	—	—	60	65	—	—	90	—	—	—	—	—
OMS PS-860, Colorscript 210, 310	—	—	—	—	—	—	40	—	—	70	—	—
OMS PS-410	—	—	80	100	—	—	135	—	—	—	—	—
OMS PS-815, 825, 815MR, 825MR	—	—	—	145	—	—	185	—	225	—	—	—
OMS 1000 Magic Color LX	—	—	—	—	—	—	40	—	—	70	115	225
OMS 3325,3825 Print System	—	—	—	—	—	—	40	—	—	70	115	225
OMS 2060 Image Server	—	—	—	—	—	—	40	—	—	70	115	—
Seikosha OP-104	—	—	45	—	—	—	—	—	—	—	—	—
Seikosha OP-108	—	—	45	60	—	—	—	—	—	—	—	—
Sharp 400 Series	—	—	—	—	—	—	99	—	—	—	165	299
Sharp JX9680	—	—	25	—	—	—	40	—	—	—	115	—
Sharp 9400, 9460, 9600, 9700E	—	—	65	75	—	—	100	—	—	—	—	—
Sharp 9500, E, H, 9700, H	—	—	85	—	—	—	145	—	—	—	—	—
Star Laser Printer 4 & Starscript	—	—	95	135	—	—	205	—	—	—	—	—
Star Laser Printer LS-5, 5EX, 5TT	—	—	130	150	—	—	255	—	350	—	—	—
Star Laser Printer 8	—	—	110	—	—	—	—	—	—	—	—	—
Star Laser Printer 8 II	—	—	110	140	—	—	195	—	—	—	—	—
Tec L8-13058	—	—	—	110	—	—	160	—	—	—	—	—
Tec L8-1321C	—	—	45	—	—	—	—	—	—	—	—	—
Tec LB-1323D	—	—	45	60	—	—	—	—	—	—	—	—
Tektronix Phaser 200E, 200i	—	—	—	—	—	—	55	—	—	—	—	—
Tektronix Phaser 540, 480, 440	—	—	—	—	—	—	—	—	—	—	115	—
Tektronix Phaser 550	—	—	—	—	—	—	—	—	—	—	115	225
Tektronix Phaser 140, 240, II50, IISDX	—	—	—	—	—	—	55	—	—	—	115	—
Tektronix Phaser 340	—	—	—	—	—	—	55	—	—	—	—	—
TI XL-PS17-PS35, Micro Writer	—	—	45	65	—	—	—	—	—	—	—	—
TI Microlaser Pro E, Powerpro 600	—	—	45	65	—	—	75	—	—	115	—	—

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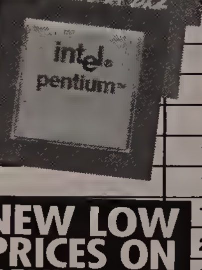
MOTHERBOARD CPU SPECIALS



		MOTHER-BOARD	MOTHER-BOARD WITH CPU
PENTIUM-100 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	$99	$199
PENTIUM-133 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	99	210
PENTIUM-150 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	99	215
PENTIUM-166 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	99	245
PENTIUM-200 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	99	340
MMX-166 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM, 82430TX CHIPSET	110	275
MMX-200 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM, 82430TX CHIPSET	110	395
MMX-233 PROCESSOR	4-PCI, 3-ISA, 512K PIPELINE, 4-72 PIN, 2 DIMM UP TO 512MB RAM, AT OR ATX, 82430TX CHIPSET	110	545
PENTIUM II 233 PROCESSOR	4-PCI, 3-ISA, 4-72 PIN, 2 DIMM, TX FORMFACTOR UP TO 512MB RAM, AT OR ATX, LX CHIPSET	209	779
PENTIUM II 233 PROCESSOR	5-PCI, 3-ISA, 4-72 PIN, 2 DIMM, TX FORMFACTOR UP TO 512MB RAM, ATX, LX CHIPSET	289	884
PENTIUM II 266 PROCESSOR	5-PCI, 3-ISA, 4-72 PIN, 2 DIMM, TX FORMFACTOR UP TO 512MB RAM, ATX, LX CHIPSET	289	1019
PENTIUM II 300 PROCESSOR	5-PCI, 3-ISA, 4-72 PIN, 2 DIMM, TX FORMFACTOR UP TO 512MB RAM, ATX, LX CHIPSET	289	1355
CYRIX-M2-166+ PROCESSOR	4-PCI, 3-ISA, 4-72 PIN, 2 DIMM UP TO 512MB RAM, AT OR ATX, 82430TX CHIPSET	110	225
CYRIX-M2-200+ PROCESSOR	4-PCI, 3-ISA, 4-72 PIN, 2 DIMM UP TO 512MB RAM, AT OR ATX, 82430TX CHIPSET	110	275
INTEL 486DX2-66	256C VLB, 7-ISA, 2-VLB, 4-30 PIN 3-72 PIN ENHANCED BIOS	95	130
INTEL 486DX4-100	256C VLB, 7-ISA, 2-VLB, 4-30 PIN 3-72 PIN ENHANCED BIOS	95	149
AMD 486DX4-133	256C VLB, 7-ISA, 2-VLB, 4-30 PIN 3-72 PIN ENHANCED BIOS	95	229
AMD-K6-166 PROCESSOR	4-PCI, 3-ISA, 4-72 PIN, 2 DIMM UP TO 512MB RAM, AT OR ATX, 82430TX CHIPSET	99	259
AMD-K6-200 PROCESSOR	4-PCI, 3-ISA, 4-72 PIN, 2 DIMM UP TO 512MB RAM, AT OR ATX, 82430TX CHIPSET	99	345
AMD-K6-233 PROCESSOR	4-PCI, 3-ISA, 4-72 PIN, 2 DIMM UP TO 512MB RAM AT OR ATX, 82430TX CHIPSET	99	499

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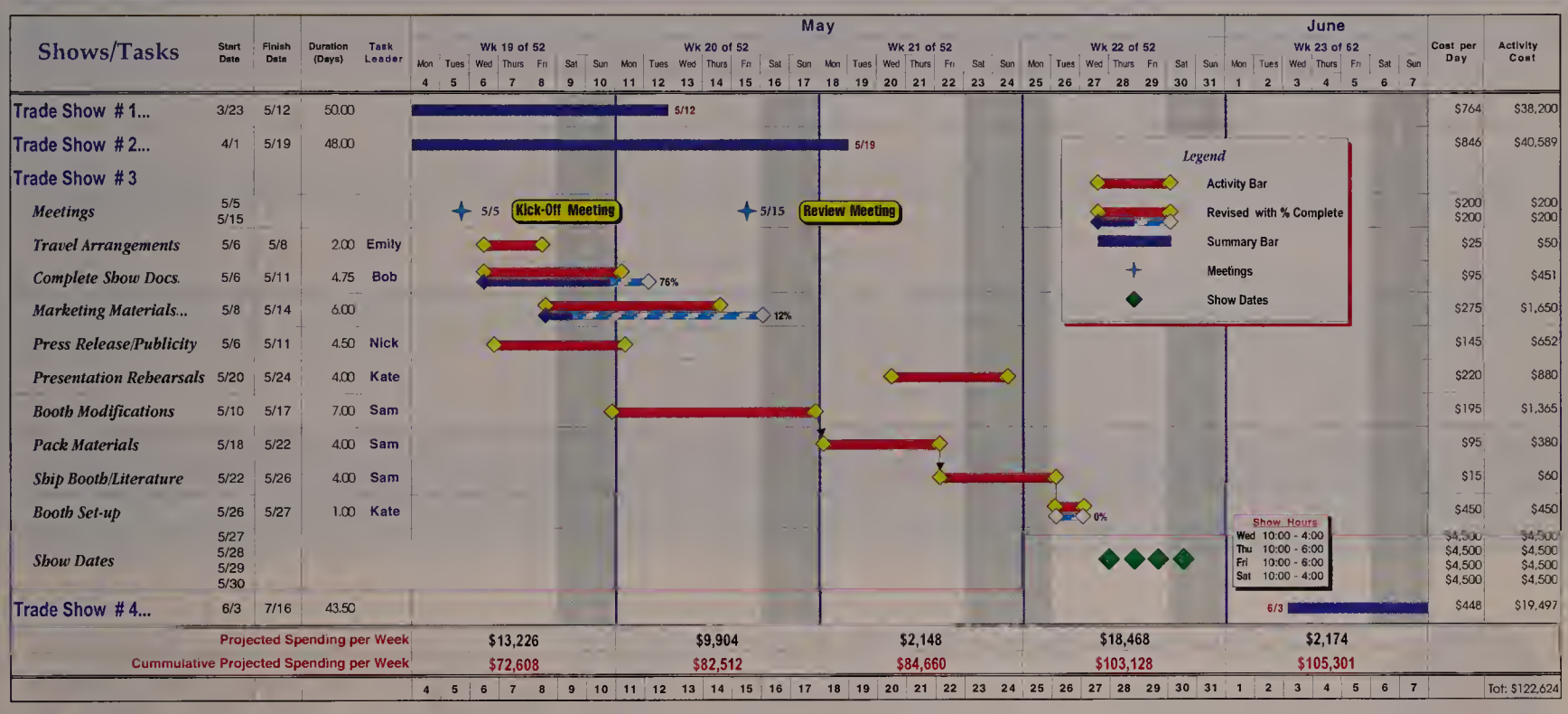

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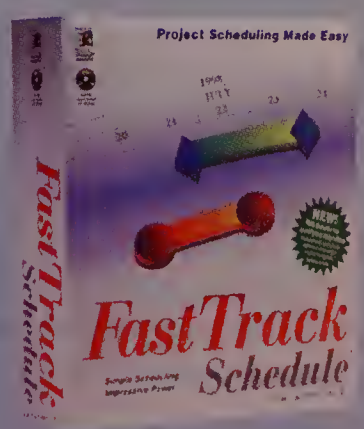

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PC WORLD

TOP 10 HOME PCs

	POWER SYSTEMS	Last month	Month tested	Street price (11/6/97)	Comments
1	Dell Dimension XPS M233s 800/388-8542 www.dell.com	1	Sept 97	$2099	**PRO:** Reasonably priced, loaded with hardware, very fast, suitable as a powerful home office PC. **CON:** Very limited software bundle.
2	Gateway 2000 G6-233 800/846-2000 www.gateway.com	2	Jan 98	$2183	**PRO:** Reasonably priced for a Pentium II, superfast, good mix of educational and family-oriented software titles. **CON:** So-so reliability rating.
3	Micron Millennia Mme with Fusion 3D 888/634-8799 www.micron.com	5	Oct 97	$2314	**PRO:** Very fast, pretty good price, generous hardware package, a bevy of games, great for demanding home office tasks and family fun. **CON:** Slowest on power chart.
4	Gateway 2000 G6-300XL 800/846-2000 www.gateway.com	4	Jan 98	$3599	**PRO:** Fastest home machine ever tested, very meaty configuration, large monitor, suitable for high-end home office tasks and family entertainment. **CON:** Superexpensive, so-so reliability rating.
5	Quantex QP6/233 M-3x 800/760-9001 www.quantex.com	3	Jan 98	$1999	**PRO:** Very reasonably priced for a Pentium II, very fast. **CON:** Lesser-known company, limited range of software.
	BUDGET SYSTEMS				
1	Gateway 2000 G5-166 800/846-2000 www.gateway.com	1	Nov 97	$1499	**PRO:** Low price includes color printer, a great bargain. **CON:** Lacks power for high-end multimedia titles, so-so reliability rating.
2	Gateway 2000 G5-200M 800/846-2000 www.gateway.com	3	Nov 97	$1839	**PRO:** Very fast, good mix of software titles. **CON:** Expensive for a budget system, middling reliability rating.
3	HP Pavilion 3100 800/724-6631 www.hp.com/info/pchome1	4	Sept 97	$1298	**PRO:** Cheapest system in Top 10, supereasy setup. **CON:** Slow, small monitor, limited software, mediocre reliability and service ratings.
4	Quantex QP5/233 M-2 800/760-9001 www.quantex.com	2	Jan 98	$1699	**PRO:** Great setup, fast for a budget machine. **CON:** Expensive for a budget machine, lesser-known company, so-so software.
5	Packard Bell Multimedia 415 800/733-5858 www.packardbell.com	–	NEW	$1299	**PRO:** Very low price, good interface. **CON:** Performance slow for a Pentium MMX-166, history of hardware problems and poor service.

Best Buy

THEY'RE BAAACK. Nine systems on this month's chart are holdovers from our last Top 10. But that doesn't mean they haven't had challengers. Quantex, CyberMax, and Acer all came out with new machines—and all missed making the chart.

Why? Price cuts. Five of the systems on last month's list now have smaller price tags—and that's great news for your pocketbook.

The cuts include a hefty $304 reduction on Micron's Pentium MMX-233–based Millennia Mme and a $100 discount on Quantex's QP6/233 M-3x that brings its price to $1999. The QP6/233 M-3x is still a power system, but it's close to being the first Pentium II to enter budget territory.

You can expect further price cuts as Intel phases out Pentium processors and pushes its new Pentium II. But should you wait to buy? If a Pentium MMX system will do the trick for you, then you should buy now; for a Pentium II system, on the other hand, budget hounds may want to keep sniffing around a while longer. It might be worth the wait.

POWER SYSTEMS

ONCE AGAIN, solid performance, a reasonable price, and lofty reliability and service numbers place Dell at the top of the power chart. But those aren't the only reasons that the Dimension XPS M233s is still the leader of the power pack.

The Dimension's PC WorldBench score of 242 makes it the fastest Pentium MMX-233 PC in the Top 10. For $2099 you get a 4.3GB hard drive, a 17-inch monitor, and an Iomega Zip drive, all important features for any serious user who's setting up a home office.

Gateway 2000 G6-300XL

Dell also provides a way to avoid PC obsolescence with its 24-month consumer lease policy. You might prefer making small monthly payments rather than a large initial one, especially if you're self-employed. And after two years you can switch to the latest model under a new lease.

If you want affordable Pentium II performance with lots of extras, check out the number two system, Gateway 2000's $2183 G6-233. Its PC WorldBench score of 255 means it can handle just about any home office task. It also has a DVD-ROM drive and a 17-inch monitor that are great for video, full-length movies, and games.

A $304 price cut helped Micron's Millennia Mme move up two notches to number three. The $2314 Mme is a fast, well-equipped, and moderately priced solution for the home office. Even though it's the slowest power machine on the chart, it's still fast for a Pentium MMX-233.

Do you have to have the fastest system on the block? When it comes to speed,

SCORECARD

★ Overall rating	PC WorldBench score/rating	Price	Reliability/ support	Setup	Features	Reader service number
90	242/very good	average	above average/ above average	fair	Pentium MMX-233, 32MB of SDRAM, 4.3GB hard drive, 12X-24X CD-ROM drive, 33.6-kilobits-per-second fax-modem, Iomega Zip drive, 17-inch monitor.	660
90	255/outstanding	above average	average/ above average	outstanding	Pentium II-233, 32MB of RAM, 4GB hard drive, DVD-ROM drive, 56-kbps fax-modem, 17-inch monitor, 3D video card with 4MB of RAM.	661
89	241/very good	average	above average/ above average	good	Pentium MMX-233, 32MB of RAM, 6.4GB hard drive, 12X-24X CD-ROM drive, 56-kbps fax-modem, Iomega Zip drive, 17-inch monitor.	662
86	270/outstanding	expensive	average/ above average	outstanding	Pentium II-300, 64MB of SDRAM, B.4GB hard drive, DVD-ROM drive, 56-kbps modem, 19-inch monitor, TV tuner.	663
85	248/very good	average	average/ average	outstanding	Pentium II-233, 32MB of RAM, 3.2GB hard drive, 12X-24X CD-ROM drive, 56-kbps fax-modem, 17-inch monitor.	664
Power scorecard weightings ▶	Performance 30 percent	Price 15 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	
90	218/good	inexpensive	average/ above average	outstanding	Pentium MMX-166, 16MB of SDRAM, 2GB hard drive, BX-16X CD-ROM drive, 56-kbps modem, 15-inch monitor, Canon BJC 250 color bubble jet printer.	665
87	239/very good	average	average/ above average	outstanding	Pentium MMX-200, 32MB of RAM, 3.1GB hard drive, 12X-24X CD-ROM drive, 56-kbps fax-modem, 17-inch monitor.	666
85	172/satisfactory	very inexpensive	average/ average	outstanding	Pentium MMX-166, 16MB of SDRAM, 2GB hard drive, BX-16X CD-ROM drive, 33.6-kbps fax-modem, 14-inch monitor.	667
85	237/very good	average	average/ average	outstanding	Pentium MMX-233, 32MB of RAM, 3.2GB hard drive, 12X-24X CD-ROM drive, 56-kbps fax-modem, 15-inch monitor.	668
84	175/satisfactory	very inexpensive	average/ average	good	Pentium MMX-166, 24MB of RAM, 3.2GB hard drive, BX-16X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor.	669
Budget scorecard weightings ▶	Performance 15 percent	Price 30 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	All products: 905

Gateway 2000's G6-300XL is king. It made sparks fly on the PC WorldBench test suite, posting 270—the highest score in the Top 10. But warm up your credit card: The G6-300XL costs $3599.

Quantex QP6/233 M-3x

But this PC does give you some hefty entertainment features along with the hefty price, including a built-in DVD-ROM drive, a 19-inch monitor, and a TV tuner.

At the other end of the Pentium II spectrum is Quantex's QP6/233 M-3x. Its WorldBench score of 248 can't touch the G6-300XL's, but at $1999 it's on the verge of qualifying as a budget PC. It'll handle demanding office apps and family fun.

BUDGET SYSTEMS

THIS MONTH'S budget leader is Gateway 2000's G5-166—and it's a terrific bargain. This $1499 machine gives you a Pentium MMX-166 CPU, 16MB of RAM, a 2GB hard drive, a 15-inch monitor, *and* Canon's BJC 250 color bubble jet printer.

It's just the ticket for the budding business or busy family with modest needs and a limited budget. The G5-166 is no speed demon, though.

In the second spot, also from Gateway 2000, is the faster but more expensive G5-200M at $1839. There's no printer, but its 32MB of RAM, 3.1GB hard drive, and 17-inch monitor make it a better choice for the more demanding home office user who clocks many hours in front of the PC.

Hewlett-Packard's Pentium MMX-166–based Pavilion 3100 moves up a notch to number three. At $1298, it's the least expensive machine on the chart by a hair. Novices will like its easy setup, but experienced fanatics will likely be frustrated by its so-so performance.

If all you want is a fast machine at a low price, check out the QP5/233 M-2 from Quantex. It's not exactly loaded with extras, but it has what it takes to get the job done: It scored 237 on PC WorldBench and costs only $1699. That's a good foundation for the do-it-yourselfer who wants to build a more elaborate system.

Thanks to its low $1299 price and easy setup, Packard Bell's Multimedia 415 snags the last spot on our budget chart. That's a first for Packard Bell, which has a long history of hardware problems and poor service. Recent surveys and numerous calls to Packard Bell's tech support indicate the situation has improved; the company is now rated average for both reliability and service. However, cautious users should wait to see if this trend continues before buying.

—*Kirk Steers*

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

Beyond the Top 10: Online

We evaluated the following systems along with the others, but they didn't score high enough to reach the Top 10 Home PCs list. For write-ups, see PC World Online (www.pcworld.com/t10homepcs).

- **Quantex QP6/300 M-4x**
- **CyberMax FamilyMax C4**
- **Acer Aspire 2280**

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PC WORLD

TOP 10 PRINTERS

	MONOCHROME PERSONAL PRINTERS	Month tested	Street price (11/1/97)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	Minolta PageWorks 6L 888/264-6658 www.minoltaprinters.com	Dec 97	$299	84	5.2	3.2	**FEATURES:** 6-ppm laser. Standard 256KB of RAM, 600-by-600-dpi maximum resolution, 150 sheets input, 100 output. **PRO:** Pretty good text quality, easy to use, sturdy construction despite small size, good CD-ROM bundle, low price. **CON:** Gray scales a little fuzzy and dark, amount of RAM fairly small.	709
2	NEC SuperScript 860 800/632-4636 www.nec.com	Dec 97	$349	83	7	3.4	**FEATURES:** 8-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 50 output. **PRO:** Blistering text speed, easy to create booklets and more, two-year warranty. **CON:** Blotchy gray-scale graphics, collates pages in reverse order.	710
3	HP LaserJet 6Lse 800/752-0900 www.hp.com	Dec 97	$399	80	5.1	2	**FEATURES:** 6-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 100 sheets input and output. **PRO:** Strong print quality and paper handling, convenient design, excellent manual. **CON:** Expensive, still the slowest text speed on the monochrome chart, software bundle not very useful.	711
4	NEC SuperScript 660plus 800/632-4636 www.nec.com	Dec 97	$249	80	5.2	3.3	**FEATURES:** 6-ppm laser. Standard 256KB of RAM, 600-by-600-dpi maximum resolution, 150 sheets input, 100 output. **PRO:** Includes CD-ROM full of fonts and clip art; prints exit face-down so they're stacked correctly, unlike with B60 model; quiet, low price. **CON:** Inadequate documentation, wrinkles envelopes.	712
5	Lexmark Optra E+ 800/539-6275 www.lexmark.com	retested this month	$399	79	5.4	1.6	**FEATURES:** 6-ppm laser. Standard 2MB of RAM, 600-by-600-dpi maximum resolution, 150 sheets input, 100 output. **PRO:** Good print quality (especially with text), good documentation, now has toll-free technical support. **CON:** Expensive, slowest graphics speed on monochrome chart.	713
	COLOR PERSONAL PRINTERS							
1	Canon BJC-4300 800/848-4123 www.ccsi.canon.com	Dec 97	$199	83	2	0.3	**FEATURES:** 5-ppm monochrome/2-ppm color ink jet. 720-by-360-dpi maximum resolution, 100 sheets input and output. **PRO:** Low price, prints fine on plain paper, very good results on ink jet stock, great manual and software, easy to install and use. **CON:** Text a bit fuzzy, second-slowest printer on color chart.	714
2	Epson Stylus Color 800 800/463-7766 www.epson.com	Dec 97	$399	80	3.8	1.1	**FEATURES:** 8-ppm monochrome/7-ppm color ink jet. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. **PRO:** Two-year warranty, network and PostScript options, very fast at 360 dpi, vivid color. **CON:** Gray scales look harsh, 1440-dpi printing is very slow.	–
3	Canon BJC-7000 800/848-4123 www.ccsi.canon.com	Dec 97	$449	80	2.3	0.3	**FEATURES:** 5-ppm monochrome/3.5-ppm color ink jet. 1200-by-600-dpi maximum resolution, 130 sheets input and output. **PRO:** Good overall print quality, impressive colors on coated paper, nice CD-ROM of extras, excellent manual. **CON:** Confusing driver interface, noisy, very expensive.	716
4	HP DeskJet 722C 800/752-0900 www.hp.com	Dec 97	$349	78	4.1	0.3	**FEATURES:** 5-ppm monochrome/1.5-ppm color ink jet. 600-by-600-dpi maximum resolution, 100 sheets input, 50 output. **PRO:** Very easy to use, quiet, great text quality on plain paper, very fast with text. **CON:** Photo prints could be better, documentation somewhat disorganized.	717
5	Canon BJC-4550 800/848-4123 www.ccsi.canon.com	retested this month	$299	78	1.9	0.3	**FEATURES:** 5-ppm monochrome/2-ppm color ink jet. 720-by-360-dpi maximum resolution, 100 sheets input and output. **PRO:** Inexpensive with $200 price drop, prints 11-by-17-inch documents, sturdy design, good text quality. **CON:** Graphics lack subtlety, slowest printer on color chart.	718

Best Buy — Windows 95-certified Plug and Play — All products: 909

HOW WE TEST The overall rating for both monochrome and color personal printers is based on print quality (25 percent), price (25 percent), features (15 percent), speed (10 percent), service and support (10 percent), and ease of use (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

GOT YOUR EYE on an expensive personal printer? If you wait long enough, its price will eventually tumble. A price drop puts an older printer on our charts for the first time this month. We first looked at the Canon BJC-4550, a wide-format color ink jet printer, more than a year ago. But it was too costly at the time to make our list. For this issue we rechecked the price and put the BJC-4550 through the new print tests we intro- ▶

duced in December. This time the BJC-4550, now $200 less at $299, lands in fifth place on our color chart.

Another older printer, the Lexmark Optra E+, also makes the chart for the first time this month. Since our October review of this printer, Lexmark installed a toll-free support line, which improves the Optra E+'s score for support. That along with slightly better performance on our new tests and a corrected price—the Optra E+ is $399, not $449 as reported in our October issue—earns this personal laser printer the number five slot on our monochrome chart.

BEHIND THE TIMES

WE EXAMINED two other older models using our new tests, but they didn't do as well. In its heyday, Panasonic's 300-dpi KX-P6100 offered good enough print quality to compete with other models. By modern personal printer standards, it's now considered outdated: At $299, it's $100 cheaper than last summer, but it still can't print at a resolution higher than 300 dpi. Most new printers can print at 600 dpi. The KX-P6100 is still very fast, however. If speed matters more to you than print quality, this model could still be the ticket—at 9.5 pages per minute with text, it's the fastest personal printer we've ever tested. The Canon BJC-80, on the other hand, offers midrange speed (2.9 ppm on text and 0.9 ppm on graphics) and portability for $299, but its mediocre print quality keeps it off the chart.

Both of the new printers we tested this month also missed the boat. Hewlett-Packard calls its "new" DeskJet 400L a revamp of the old 400 model—but it's the same product sold without a color ink cartridge and priced at $50 less. It's still a slow, poor-quality printer. Lexmark's 7200 Color Jetprinter, the other new printer we tested, jammed our paper and streaked our color documents. We'll test it again after the bugs have been worked out.

OLDIES BUT GOODIES

THE LEXMARK Optra E+'s $399 price is fairly high for a personal laser, which is one reason it didn't climb any higher than fifth place. It's also extremely slow at printing graphics. But the Optra E+ does make good prints—slightly better, actually, than the number one Minolta PageWorks 6L, which has the same engine. (Each model's software, firmware, and design can also affect its print quality.)

At $200 off its original price, Canon's BJC-4550, our new fifth-place printer on the color chart, is a good value made better. It's especially well priced for a wide-carriage model that can print on paper sizes up to 11 by 17 inches. We also like the fact that you can replace its color cartridge with an oversize black-ink cartridge, giving you two black cartridges for long text jobs. Other printers, however, surpass the BJC-4550 in print quality. Its text is very black, and italics (which some printers have trouble with) look smooth, but its gray-scale and color images lack the subtlety we've come to expect based on other Canon printers we've tested.

THE $399 LEXMARK Optra E+ climbs onto our monochrome chart in fifth place with strong print quality and better support.

RETURN OF THE SINGLE-CARTRIDGE PRINTER

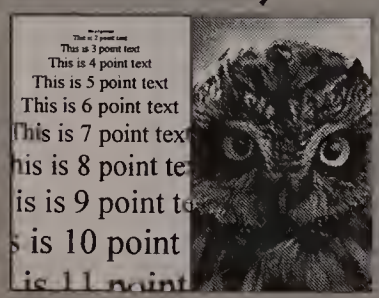
SEVERAL MONTHS AGO we gleefully announced the extinction of single-cartridge ink jet printers, which make you swap the black and color cartridges for different kinds of print jobs. At that time, most major printer vendors had abandoned single-cartridge designs in favor of entry-level dual-cartridge models. HP, for one, shelved the wretched DeskJet 400 and brought out the $199 DeskJet 672C, which stayed on our color chart for several months. It is now with regret that we note a new wave of single-cartridge ink jets, including HP's DeskJet 400L.

There was good reason to rejoice at the expected elimination of single-cartridge printers. Switching cartridges for different print jobs is inconvenient, and sticking with just the color cartridge gives you lousy black text. The $149 DeskJet 400L suffers from both of these problems—and more. HP ships the 400L without a color cartridge—if you want to print color, you have to buy the color cartridge separately. Don't bother, though. Like the older DeskJet 400, the 400L prints dull, muddy gray-scale and color images—and black text with a green tint. It's also among the slowest ink jets we've tested, printing text at only 1.7 ppm.

—*Dan Littman* ■

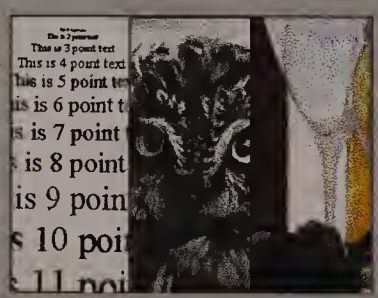
PRINT QUALITY SAMPLES

Grim Gray Scales From Minolta, HP, Canon



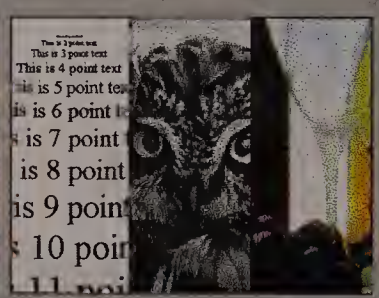
MINOLTA PAGEWORKS 6L

The top-ranked PageWorks 6L offers decent text, but its gray-scale images come out dark. We like this inexpensive printer for its compact yet sturdy design.



HP DESKJET 400L

This "new" printer is really the old DeskJet 400 with a name change. Its text is still rough, its gray scales awful, and its colors weak and uninspiring.



CANON BJC-4550

We were fond of this wide-format printer's solid black text, but its gray-scale and color images lack the subtlety we've seen in other Canon printers.

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TOP 10 MONITORS

	15-INCH MONITORS	Month tested	Street price (11/17/97)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	CLR Vision Pro 15 800/611-1555 www.clrusa.com	NEW	$249	84	very good/ very good	**FEATURES:** 13.4-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 12-hour weekday toll-free support. **PRO:** Sharp text, realistic graphics, second-lowest price on chart. **CON:** Smallest viewable area here, fairly crude on-screen menu icons.	689
2 (TIED)	Panasonic PanaSync Pro P15 800/742-8086 www.panasonic.com/alive	Oct 97	$349	83	very good/ excellent	**FEATURES:** 14-inch viewable area, .27mm dot pitch tube, up to 75-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** Crisp text and best color graphics with unusually clear detail, large viewable area, easy-to-adjust on-screen controls. **CON:** No tilt control, above-average price.	690
2 (TIED)	Mitsubishi Diamond Scan 15VX 800/843-2515 www.mitsubishi-display.com	Oct 97	$350	83	very good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] image correction utility, three-year warranty, 12-hour weekday toll-free support. **PRO:** Terrific text, detailed graphics, very fast refresh rate, plenty of plain-language menus. **CON:** No tilt control, above-average price.	691
4	MaxTech XT-5862 800/936-7629 www.maxcorp.com	Dec 97	$209	82	very good/ very good	**FEATURES:** 13.9-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 8-hour weekday toll-free support. **PRO:** Lowest price after $40 price drop, sharp picture, very fast refresh rate. **CON:** No on-screen menus, bare control set, no manual degauss, short support hours.	692
5	Nokia 449Xiplus 800/296-6542 www.nokia.com	NEW	$379	82	very good/ very good	**FEATURES:** 13.5-inch viewable area, .25mm stripe pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. **PRO:** Fine picture, great controls, very fast refresh rate, handsome styling, mike, speakers. **CON:** Relatively small viewable area, highest price.	693
6	GoldStar Studioworks 57i 800/243-0000 www.lgeus.com	Dec 97	$280	82	very good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** Fine image quality, attractive price, well-designed and easy-to-adjust controls, very fast refresh rate. **CON:** Boxy appearance.	694
7	MAG InnoVision DJ530 800/827-3998 www.maginnovision.com	Dec 97	$288	82	very good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support (automated for 12 hours after 5 p.m.). **PRO:** Sharp text and graphics, affordable, easy to adjust. **CON:** Awkwardly placed power switch.	695
8	Samsung SyncMaster 500b 800/933-4110 www.sosimple.com	Dec 97	$300	82	very good/ very good	**FEATURES:** 13.6-inch viewable area, .28mm dot pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** Fine picture quality, very fast refresh rate, sleek contemporary design, easy to adjust. **CON:** Fairly crude on-screen menu icons.	696
9	Hitachi SuperScan Pro 500 800/441-4832 www.nsa-hitachi.com	Oct 97	$299	82	good/ very good	**FEATURES:** 13.6-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 8-hour weekday toll-free support. **PRO:** Good-looking graphics with lifelike colors, very fast refresh rate. **CON:** Short support hours, text in our newsletter not as dark and sharp as on some monitors.	697
10	Compaq P50 800/345-1518 www.compaq.com	NEW	$325	81	good/ very good	**FEATURES:** 13.6-inch viewable area, .28mm dot pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** One year free on-site service, crisp and accurate color graphics, very fast refresh rate. **CON:** Small fonts in our spreadsheet and newsletter were slightly fuzzy.	698

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10monitors. All products: 907

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] Highest refresh rate at 800 by 600 resolution.

[2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

CLR'S NEW VISION PRO 15 earns number one this month with a low $249 price, a fine picture, a full set of adjustments, and even a TCO'92 rating for reduced emissions. The Panasonic and Mitsubishi tied for second are sharper yet but more expensive. Nokia's classy multimedia 449Xiplus debuts at number five, while Compaq's new business P50 takes tenth. And a price cut to $209 pushes MaxTech's bare-bones XT-5862 up to fourth. ■

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TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARDS	Month tested	Street price (11/3/97)	Overall rating	PC WorldBench graphics score/ rating	3D rating	Multimedia rating	Comments	Reader service number
1	ATI 3D Pro Turbo PC2TV 905/882-2600 www.atltech.com	Oct 97	$219	97	189/ very good	good	outstanding	**FEATURES:** 8MB of SGRAM, 200-MHz RAMDAC, ATI Rage II chip, software for 3D modeling, image editing, and VRML. **PRO:** Terrific multimedia performance, nice 3D, connects to a TV. **CON:** Expensive, mediocre video playback, no toll-free support.	673
2	ATI Xpert@Work 905/882-2600 www.atitech.com	Dec 97	$169	95	191/ outstanding	good	good	**FEATURES:** 4MB of SGRAM (upgradable to 8MB), 230-MHz RAMDAC, ATI Rage Pro chip, bundled photo editing and 3D modeling software. **PRO:** Fast all around, great utilities, connects to a TV, good price. **CON:** So-so 3D images, no toll-free support.	674
3	STB Nitro 3D 800/234-4334 www.stb.com	Dec 97	$99	95	190/ outstanding	adequate	adequate	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/VX chip, bundled 3D games. **PRO:** Least-expensive board on chart, fast 2D, toll-free support, lifetime warranty, excellent AVI video playback. **CON:** 3D images look below average.	675
4	Diamond Stealth 3D 3000 800/468-5846 www.diamondmm.com	Jan 98	$170	94	191/ outstanding	adequate	very good	**FEATURES:** 4MB of VRAM, 220-MHz RAMDAC, S3 Virge/VX chip, bundled 3D game and 3D design software, multimedia encyclopedia. **PRO:** Fast 2D, decent-looking 3D games, perfect AVI video playback. **CON:** 3D is not fast, no toll-free support.	676
5	ATI 3D Xpression+ PC2TV 905/882-2600 www.atitech.com	Oct 97	$115	94	190/ outstanding	adequate	adequate	**FEATURES:** 4MB of SGRAM, 170-MHz RAMDAC, ATI Rage II chip, bundled 3D games plus 3D modeling, image editing, and VRML software. **PRO:** Good 2D, speedy 3D, nice bargain, connects to a TV. **CON:** Mediocre video playback, no toll-free support.	677
6	Diamond Stealth 3D 2000 Pro 800/468-5846 www.diamondmm.com	Jan 98	$135	93	191/ outstanding	good	very good	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/DX chip, bundled 3D game, photo editing software, and multimedia encyclopedia. **PRO:** Great 2D, inexpensive, fast 3D, connects to a TV. **CON:** No toll-free support.	678
7	Hercules Terminator 3D/DX 800/532-0600 www.hercules.com	Oct 97	$109	93	189/ very good	adequate	very good	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/DX chip, bundled 3D games. **PRO:** Inexpensive, quick in multimedia programs, excellent AVI video playback, toll-free support. **CON:** Subpar 3D quality overall, driver bug in Terracide game.	679
8	STB Velocity 128 800/234-4334 www.stb.com	Nov 97	$199	93	189/ very good	very good	adequate	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled games, 3D image editing software. **PRO:** Excellent 3D quality, strong 2D performance, good game software. **CON:** Poor AVI video playback, low-res multimedia performance.	680
9	Hercules Stingray 128/3D 800/532-0600 www.hercules.com	Oct 97	$229	90	184/ very good	very good	poor	**FEATURES:** 4MB of EDO DRAM, 180-MHz RAMDAC, Alliance ProMotion-AT3D chip, 3Dfx Voodoo Rush 3D chip set, bundled games. **PRO:** Terrific 3D quality, toll-free tech support. **CON:** Priciest on chart, 2D performance uncompetitive (though decent).	681
10	STB Velocity 3D 800/234-4334 www.stb.com	Dec 97	$199	90	189/ very good	poor	adequate	**FEATURES:** 4MB of EDO VRAM (upgradable to 8MB), 220-MHz RAMDAC, S3 Virge/VX chip, bundled games. **PRO:** Good 2D and AVI video playback, nice for graphics pros, toll-free support, lifetime warranty. **CON:** Slow 3D, poor 3D quality overall.	682

Best Buy online For reviews of products that didn't make the chart, visit www.pcworld.com/t10graphics. All products: 906

HOW WE TEST We tested PCI boards under Windows 95 with PC WorldBench 1.0 at 800 by 600 and 16.8 million colors, at 1024 by 768 and 65,536 colors (reported here), and at 1280 by 1024 and 65,536 colors. The 3D rating is based on frame rates in our VRML and 3D game tests and on subjective ratings in three games. The multimedia rating is based on frame rates in our Macromedia Director and AVI playback tests and on timed scores in our PowerPoint multimedia presentation tests. Boards were tested in a Dell Dimension XPS P133c with 32MB of EDO DRAM and 256KB of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

MOST OF TODAY'S 2D/3D combo boards do fine with 2D, but they vary considerably in 3D performance and multimedia playback. This month we increased our scoring emphasis on 3D and multimedia tests to reflect these differences. As a result, overall ratings are down a little and some rankings have changed. Example: The Hercules Stingray 128/3D, which fell off our chart in November, earns spot nine now because of its excellent 3D. ■

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PC WORLD

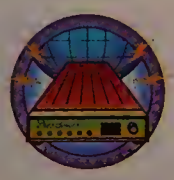
TOP 10 MODEMS

	33.6-KBPS EXTERNAL MODEMS	Month tested	Street price (11/17/97)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	3Com Courier V.Everything With V.34 External 800/877-2677 www.3com.com	Jan 97	$225	80	2:42	**FEATURES:** Flash ROM, distinctive ring, 230.4-kbps PC-to-modem speed, manual volume control, password protection, callback security, QuickLink II fax/data software. **PRO:** Rich in features, great documentation. **CON:** Most expensive modem on chart, takes up a lot of desk space.	650
2	Zoom FaxModem V.34X Plus 800/631-3116 www.zoomtel.com	Aug 97	$99	79	2:52	**FEATURES:** MNP-10EC error control, distinctive ring, 115.2-kbps PC-to-modem speed, serial cable, DOS/WinFax Lite fax/data software. **PRO:** Low price, easy-to-follow documentation, seven-year warranty. **CON:** Lackluster performer, no security features such as password protection.	651
3	Logicode Quicktel II-E With LED Array 800/735-6442 www.logicode.com	Oct 97	$110	79	2:52	**FEATURES:** 115.2-kbps PC-to-modem speed, voice mail, speakerphone, DSVD, microphone, Caller ID, QuickLink II Message Center and Intel ProShare software. **PRO:** Affordable, full-featured, good documentation, novel curved design. **CON:** A bit sluggish, supplied book about the Internet is outdated.	652
4	Practical Peripherals 336 MiniTower Internet Kit 800/225-4774 www.practical.com	May 97	$119	78	2:40	**FEATURES:** 115.2-kbps PC-to-modem speed, QuickLink II fax/data software. **PRO:** Fast performer, very good support policies including lifetime warranty and weekend tech support. **CON:** Bare-bones, no security features such as password protection and Caller ID, tech support calls are on your dime.	653
5	Microcom OfficePorte Voice 33.6 800/822-8224 www.microcom.com	May 97	$120	78	2:44	**FEATURES:** MNP-10 and MNP-10EC error control, distinctive ring, 115.2-kbps PC-to-modem speed, voice mail, ASVD, built-in microphone, serial cable, Focal Point fax/data software. **PRO:** Nice features, cross-ship modem replacement. **CON:** Heavy-handed documentation, no security features such as Caller ID.	654
	56-KBPS EXTERNAL MODEMS						
1	Motorola ISG VoiceSurfr 56K External 800/566-3266 www.mot.com/modems	NEW	$129	81	2:25/3:05 [1]	**FEATURES:** K56flex protocol, distinctive ring, 230.4-kbps PC-to-modem speed, voice mail, speakerphone, audio cable, microphone, Caller ID, Trio software. **PRO:** Nice SOHO features, toll-free support, free upgrade to future 56-kbps standard even if modem swap required. **CON:** Sparse support hours, no cross-ship replacement.	655
2	Global Village Communication TelePort 56/x2 Fax/Modem 800/736-4821 www.globalvillage.com	Dec 97	$119	80	2:59/2:56 [1]	**FEATURES:** x2 protocol, 115.2-kbps PC-to-modem speed, serial cable, Global Transfer Light and FaxWorks software. **PRO:** Lowest price on 56-kbps chart, installation is a breeze, great documentation. **CON:** Sluggish 33.6-kbps performance, short tech support hours, free upgrade to future 56-kbps standard limited to software.	656
3	3Com U.S. Robotics 56K Faxmodem External 800/342-5877 www.3com.com	Oct 97	$219	79	2:44/2:56 [1]	**FEATURES:** x2 protocol, distinctive ring, 115.2-kbps PC-to-modem speed, manual volume control, RapidComm software. **PRO:** Terrific documentation, free upgrade to future 56-kbps standard even if modem swap required. **CON:** Only 56-kbps modem on chart over $200, no cross-ship replacement.	657
4	Zoom FaxModem 56Kx 800/631-3116 www.zoomtel.com	Nov 97	$139	79	2:31/3:08 [1]	**FEATURES:** K56flex protocol, MNP-10EC error control, distinctive ring, 230.4-kbps PC-to-modem speed, COMit and WinFax Lite software. **PRO:** Fast on 33.6-kbps tests, long support hours including Saturday, free upgrade to future 56-kbps standard even if modem swap required. **CON:** Few extras, no security features like Caller ID.	658
5	Shark Multimedia Leopard XT-56K Fax/Modem with Simultaneous Voice & Data 800/800-3321 www.sharkmm.com	NEW	$120	78	2:34/3:08 [1]	**FEATURES:** K56flex protocol, distinctive ring, 115.2-kbps PC-to-modem speed, voice mail, speakerphone, VoiceView, ASVD, manual volume control, serial cable, Caller ID, DialTone software. **PRO:** Feature-packed, affordable. **CON:** Short warranty, no cross-ship replacement, free upgrade to 56-kbps standard limited to software.	659

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems. All products: 904

HOW WE TEST We test 33.6-kbps modem-to-modem performance using a pair of identical modems on a Telecomm Analysis Systems simulated phone network. It sends a text file over 55 line conditions, and a mix of five files—graphics, text, program, and compressed files—over one line condition. For our 56-kbps tests, we call a local Internet service provider access number and transfer .jpg, .doc, and .zip files continuously over an 18-hour period. The times to transfer a megabyte of data are higher in the ISP test than in the TAS test because the files used in the former are less compressible. Results for the two tests are not comparable. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] V.34 TAS transfers/56-kbps ISP downloads.



MOTOROLA'S NEW ISG VoiceSurfr 56K External grabs our 56-kbps Best Buy this month. It's an affordable modem with small- and home-office features such as voice mail and speakerphone. Shark Multimedia's new Leopard XT-56K Fax/Modem also offers a nice array of SOHO features, plus extras like a bundled serial cable. Meanwhile, Practical Peripherals and Microcom move up on our 33.6-kbps chart as two other units are discontinued. ■

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Common features: ◆ Mini-Tower Model ◆ 512KB Integrated L2 Cache ◆ 3.5" Floppy Disk Drive ◆ Two USB Ports ◆ Microsoft® Office 97 Small Business Edition plus Bookshelf 98 ◆ McAfee VirusScan ◆ Microsoft Windows® 95 ◆ Microsoft Internet Explorer 4.0 ◆ MS® IntelliMouse® ◆ Dell Quiet Key Keyboard ◆ 3 Year Limited Warranty† with 1 Year On-site^Δ Service **Upgrades:** ◆ 3Com® 3C905 Fast EtherLink™ XL 10/100 PCI Card, add $79 ◆ Iomega® Zip™ 100MB Internal Drive, add $99

DELL DIMENSION XPS D300 300MHz PENTIUM® II PROCESSOR FEATURING MMX™ TECHNOLOGY	DELL DIMENSION XPS D300 300MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY	DELL DIMENSION XPS D266 266MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY	DELL DIMENSION XPS D233 233MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY
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CHECK THE FEATURES. CHECK THE PRICES.

DELL DIMENSION DESKTOPS FOR HOME

Common features: ◆ Mini-Tower Model ◆ 512KB L2 Cache ◆ 56K Capable** U.S.Robotics x2 WinModem ◆ 3.5" Floppy Disk Drive ◆ Two USB Ports ◆ Microsoft Home Essentials 98 with Money 98 ◆ McAfee VirusScan ◆ Microsoft Windows 95 ◆ Microsoft Internet Explorer 4.0 ◆ Microsoft IntelliMouse ◆ 3 Year Limited Warranty† with 1 Year On-site^Δ Service **Upgrades:** ◆ Iomega Zip 100MB Internal Drive with One Cartridge, add $99 ◆ 3 Year Next-Business-Day On-site^Δ Service, add $99

DELL DIMENSION XPS D300 300MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY	DELL DIMENSION XPS D300 300MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY	DELL DIMENSION XPS D266 266MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY	DELL DIMENSION XPS D233 233MHz PENTIUM II PROCESSOR FEATURING MMX TECHNOLOGY
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SOFTWARE DESCRIPTIONS

Microsoft Office 97 Small Business Edition (SBE) includes:

- Word 97
- Excel 97
- Publisher 97
- Outlook 97
- Automap Streets Plus
- Small Business Financial Mgr. 97

Microsoft Home Essentials 98 (available on desktops only) includes:

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300MHz PENTIUM II PROCESSOR
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- 3-Year Next-Business-Day On-site△ Service

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266MHz PENTIUM PROCESSOR
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Common features listed above plus:

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- 64MB SDRAM Memory
- 512KB L2 Pipeline Burst Cache
- 4GB Ultra ATA Hard Drive
- 128-bit Graphics Accelerator with 65K Colors at 1024x768
- MS Office 97 Small Business Edition
- MS Windows 95/Internet Explorer
- 6.9 Pounds*/Touchpad

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Common features listed above plus:

- 13.3" XGA Active Matrix TFT Display
- 32MB SDRAM Memory
- 512KB L2 Pipeline Burst Cache
- 3.2GB ATA Hard Drive
- 128-bit Graphics Accelerator with 65K Colors at 1024x768
- MS Office 97 Small Business Edition
- MS Windows 95/Internet Explorer
- 6.9 Pounds*/Touchpad

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- 512KB L2 Pipeline Burst Cache
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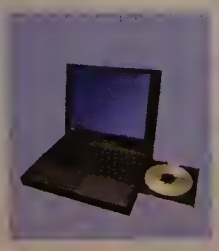
- 256KB L2 Pipeline Burst Cache
- 2.1GB ATA Hard Drive
- 128-bit Graphics Accelerator with 16 Million Colors at 800x600
- MS Office 97 Small Business Edition
- MS Windows 95/Internet Explorer
- 6.4 Pounds*/Touchpad

★ *Upgrade to 64MB RAM, add $299.*
★ *Deluxe Nylon Carrying Case, add $69.*

$2599

Business Lease◊: $95/Mo., 36 Mos.
Order Code #890107

of configurations available.



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"...adds a level of control and functionality we could never coax out of a plain old mouse."
Windows Sources

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C/NET

"Windows Stellar NOVEMBER 1997"

"If ergonomics, comfort and precision are worth a lot to you, the Power Cat will make a worthwhile addition to your home or office set-up."
Computer Dealer News

"My mouse has turned into a sullen, dusty creature of late since I've been busy playing with the Power Cat."
Florida Union Times

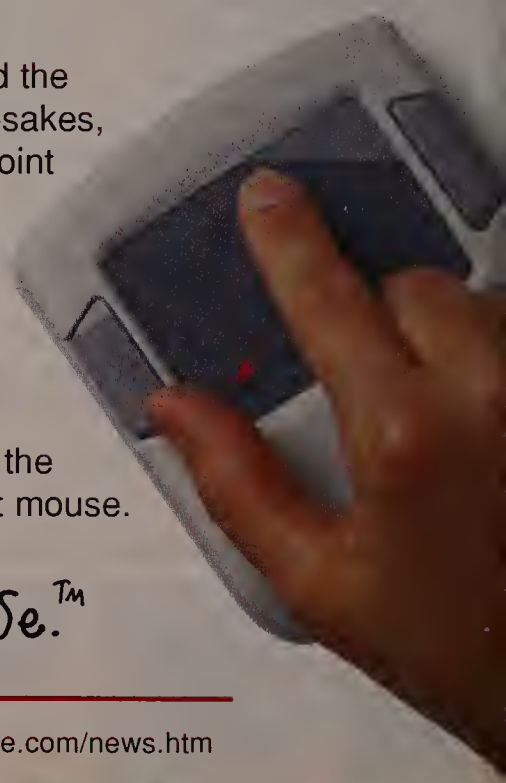
"These 'cats' could chase off your mouse...navigate Web pages without having to move the on-screen cursor."
Business Week

"...remarkably quick and easy to zoom in and out of a spreadsheet."
Windows Magazine

People are purring about the Cirque Cat touchpads.

Why? Because the Cirque Easy Cat™, the Cirque Smart Cat™ and the Cirque Power Cat™ are the ultimate pointing devices. Like their namesakes, their intelligence is instinctive, letting you simply glide your finger to point the cursor, scroll through page after page or zoom in and out. The Power Cat even makes surfing between Web pages as easy as gliding your finger back and forth, and it lets you add your signature or handwritten notes to documents with the Power Cat stylus. The Cirque Cat touchpads take up less desk space and they work without the need for regular cleaning.

These Cats have people scratching at the doors of stores all over the country. Get one and see how they can outperform even the smartest mouse.



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Get a Life: Great Ways to Manage Time

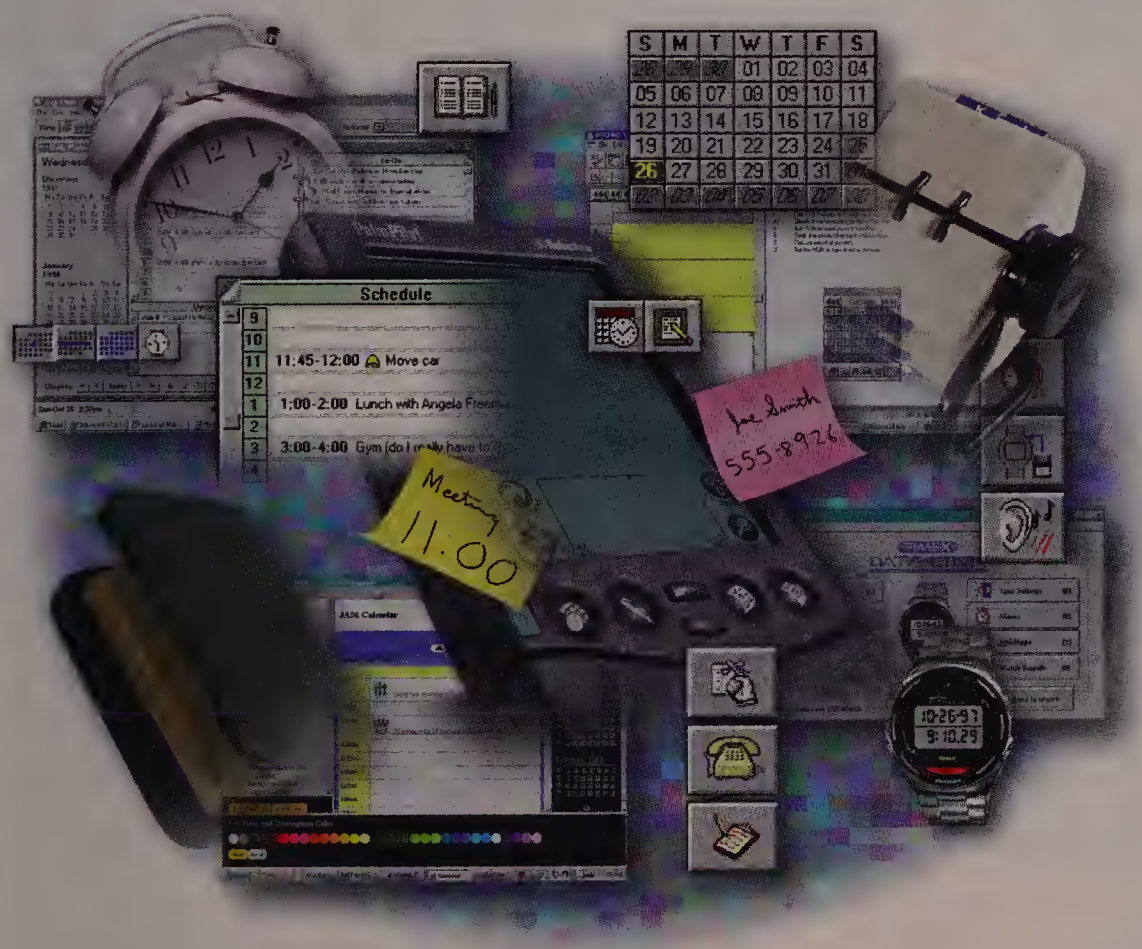


ILLUSTRATION: JEFF BERLIN

EVERY WEDNESDAY AT HIGH NOON, I go *mano a mano* with a San Francisco civil servant. More often than I care to admit, the civil servant wins. Wednesday is street-cleaning day in my neighborhood, and if I don't move my car by noon, an intimidating parking control officer immediately materializes and slaps a $25 ticket on my windshield. In the three years I've worked out of my home office, I've spent so much money on parking fines that I've probably single-handedly paid for the officer's latest root canal excavation.

But that was then. Now, I'm no longer overwhelmed by such minutiae as remembering to move my car. I'm organized, more efficient, and (most important) unafraid of transportation authorities—all thanks to my PC.

EDITED BY
Angela Freeman, Anne Kandra, and Scott Spanbauer

ON-SCREEN ORGANIZERS

TO GAIN GROUND in my battle for supremacy and to achieve maximum efficiency, I turned to two PC calendar/organizer programs: Day-Timer Organizer 98, a brand-new version of a venerable package; and Ascend 97, a Day-Timer competitor. I tried two hardware-based organizers on for size as well: 3Com's PalmPilot, which fit nicely in the palm of my hand, and the Timex Data Link 150 watch, which fastened to my wrist and let me beam appointments, phone numbers, and other data from my PC. I also used Pacifica Software's WebCalendar, a new Web-based scheduler.

Day-Timer Organizer 98 is my favorite, with lots of features not found in paper planners or in the other software and hardware organizers I tested.

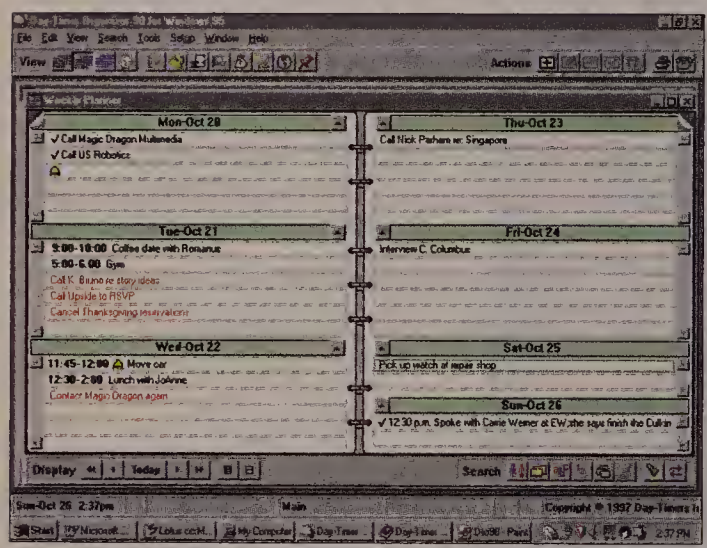
As with previous versions, DTO 98 lets you view calendars by day, week, or month; add to-do's to a task list; record notes in a daily work record; track your expenses; keep an address book and automatically dial phone numbers; and—one of my favorite features—create regularly scheduled, audible reminders. Now, every Wednesday at 11:45 a.m., my PC chimes to remind me to move my car, and 15 minutes later a disappointed parking official appears near my driveway, ticket pad in hand, trying not to pout.

Ascend 97 does most of these things as well, but DTO 98's interface is better integrated. Its daily calendar view places four windows on screen at once. This arrangement lets me quickly schedule an appointment, add a task, record notes from phone calls, and so on, without having to switch to a different view.

I feel as if I'm using my paper-based Day-Timer organizer, except I'm typing instead of writing, and I'm more efficient. I check off a completed task by dragging it from the To-Do window to the Diary & Work Record window, for instance. What's more, DTO 98 automatically transfers uncompleted tasks to the next day's list. The only thing easier would be for Day-Timer to complete the task for me, ▶

though I suppose that's asking a bit much.

Ascend 97, by contrast, has a modular interface that isn't as intuitive or as integrated. To move a completed task into a daily work record, for instance, my only option is to copy and paste it into a journal window. Transferring unfinished tasks to a new date is also harder than with the Day-Timer program.



BETTER THAN EVER: Day-Timer Organizer 98's interface looks much like the paper version but offers more features.

Express Services are one of DTO 98's best new features. The installation process places a tiny program icon on the far-right side of the Windows 95 Taskbar. By clicking the icon, I get an Express Services pop-up menu, from which I can quickly look up a phone number or add an item to my to-do list, such as 'Place sharp tacks directly in the path of municipal vehicles'.

Importing data into DTO 98 is also easier than with Ascend 97 and easier than it was with previous versions of Day-Timer. Importing contact information from Microsoft Outlook is amazingly easy. For example, I made a few selections from a drop-down menu, and that was that. DTO 98 can import directly from Microsoft Schedule+ and Symantec's Act as well. Ascend 97, however, can directly import data only from Microsoft Access 95, from earlier versions of Ascend, or from files that are tab, character, comma-quote, or line delimited—and that's a hassle.

For all its praiseworthy aspects, however, DTO 98 has its drawbacks. With so many features and so much flexibility, the program suffers from that dreaded malady *iconus overloadus.* I counted no fewer than 36 icons in the daily planner view, resulting in a cluttered and at times confusing screen, although the pop-up balloons help.

As much as I like DTO 98, I'm not ready to fully surrender my portable, paper-based Day-Timer binder system. Fortunately, it's easy to use both. I keep track of my to-do's, appointments, and contact information in my PC Day-Timer. Then, when I go out for the day or when I travel, I print what I need on paper that's specifically formatted to fit my Day-Timer binder ($12.95 for 200 sheets).

TAKING IT WITH YOU

SPEAKING OF GETTING out of the house, I can be organized and efficient just about anywhere these days, thanks to **3Com's PalmPilot.** The handheld organizer has become justifiably famous for its small size (not much bigger than a deck of cards), light weight (5.7 ounces, with batteries), and ease of use. Most important, I can share address book entries, appointments, and other data with DTO 98 and other PC applications, among them Microsoft Schedule+ and Outlook, Lotus Organizer, and Ascend 97.

To connect to a PalmPilot, DTO 98 requires the purchase and installation of a separate software program, Puma Technology's **IntelliSync,** on a desktop PC.

Ascend 97, however, includes its own link to the PalmPilot, and moving data between the two is astonishingly easy. After a few initial setup chores on either end, I popped the PalmPilot into its desktop cradle (which connects to the PC's serial port by cable), selected the HotSync feature on the PalmPilot, and clicked its LocalSync icon. My data was zapped from the PalmPilot to the PC. The standard PalmPilot lists for $249, while $369 will buy you the PalmPilot Professional, which offers e-mail capabilities, more memory, and more built-in software. At these prices, the PalmPilot is a must-have for anyone who is too busy and/or too disorganized to keep up with everything.

IT'S ALL ON THE WRIST

FOR AN ENTIRELY different experience, I tried the **Timex Data Link 150** watch. Timex gets the award for most futuristic organizer, no question. I typed a few upcoming appointments in the included Data Link 2.1 desktop software, then held the watch up to my computer monitor and beamed the appointments directly to a little eye ▶

Scorecard

Ascend 97
Grade: **C**; Price: $100 street; Franklin Covey; 800/877-1814; www.franklincovey.com
READER SERVICE NO. 683

Timex Data Link 150
Grade: **C+**; Price: $139 street; Timex; 800/367-8463; www.timex.com
READER SERVICE NO. 684

Day-Timer Organizer 98
Grade: **A-**; Price: $60 street; Day-Timer Organizer 98 Deluxe CD-ROM $80 street; Day-Timer Concepts; 800/225-5005; www.daytimer.com
READER SERVICE NO. 685

IntelliSync
Grade: **B+**; Price: $69.95 list; Puma Technology; 800/774-7862; www.pumatech.com
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PalmPilot
Grade: **B+**; Price: PalmPilot Personal $249 list; PalmPilot Professional $369 list; 3Com; 800/881-7256; www.palmpilot.com
READER SERVICE NO. 687

WebCalendar
Grade: **B**; Price: software and first year of service $50 street; service for each subsequent year $50; Pacifica Software; 800/755-9036; www.pacificawebcal.com
READER SERVICE NO. 688

F Y I

MORE PC shoppers are dropping less than a grand for their systems. Nearly 40 percent of PCs sold at retail were priced at less than $1000 during August 1997, the most recent month for which data is available. That's a big change from January, when only 7 percent were so cheap.

SOURCE: COMPUTER INTELLIGENCE

ILLUSTRATION: RANDALL ENOS

AVerMedia MPEG Wizard

FEATURES

External Full Motion Video Capture with MPEG-1 Compression (up to 200:1 ratio)

24-Bit Color Image Capture (up to 1600 x 1200)

Extremely Affordable only $349 (MSRP)

Real Time Audio/Video Muxing

Supports Low-Bit-Rate/ Low- Frame-Rate Capture

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APPLICATIONS

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Video CD Production

Video Screen Saver

WebCasting (Video Streaming)

Low-Bit-Rate/ Low-Frame-Rate Video Applications

Multimedia Greeting Cards

And So Much More...

You Don't Need Magic to Capture Full Motion Video & Audio with MPEG-1 Compression (up to 200:1 for Video Compression)

and no longer will you pay supernatural prices either. Introducing AVerMedia MPEG Wizard – the hassle-free and extremely affordable EXTERNAL device for all your high compression and high quality video and image capturing. What truly sets the MPEG Wizard ahead from the competition is not magic but several unique features including:

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2. Low-Bit-Rate/Low-Frame-Rate (LBR/LFR) Support: These features make your files even smaller than the standard MPEG-1 file which allows you faster uploading & downloading time and minimizes your hard disk space.

3. Powerful Software Applications: Bundled with a wide array of software titles for endless video applications, you can now create video e-mails, multimedia greeting cards, video streaming and a lot more. Some titles include iFilmEdit, Studio M, Video Control, NET TOOB Stream and Kai's Power Goo 1.0 SE - The Fusion Room. Show off your work of art to all your friends, family and clients, the only limitation lies in your imagination!

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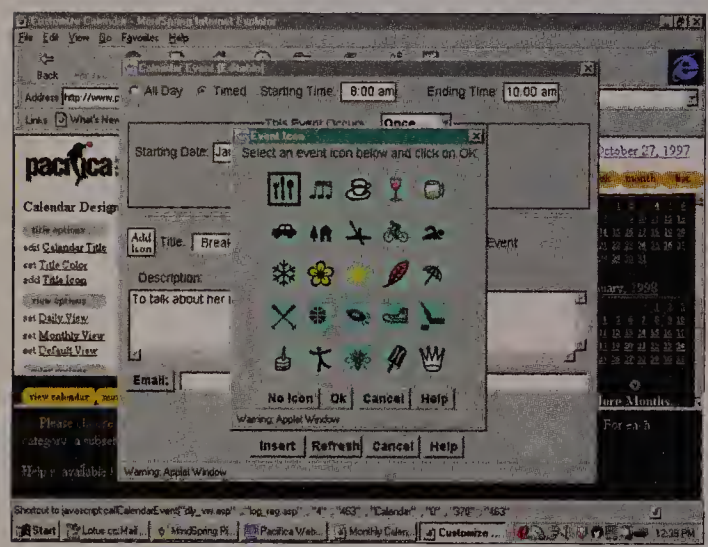
on the watch. Then I pressed a button on the watch several times until I found my meeting particulars, which were displayed on the face.

Moving the data from PC to wrist is easy and fun. Besides importing data with the Data Link software, I can transfer phone numbers, to-do lists, and other information from Schedule+, Outlook, and a few other programs. Timex now sells a variety of Data Link watch styles, but the idea of using a small computer as a fashion accessory strikes me as taking the digital age a tad too far.



LIFE ON THE WEB: Keep track of important events online with Pacifica Software's WebCalendar.

POST IT ON THE WEB

A FAR BETTER idea for futuristic organizers is Pacifica Software's **WebCalendar.** Instead of having to synchronize a calendar on a desktop PC with one on a handheld computer, laptop, or wristwatch, why not maintain just one schedule on the Web and access it from wherever you are?

Creating a schedule with WebCalendar requires several steps, all of which I found easy to do. Once I installed and launched the software (which comes on a CD-ROM), WebCalendar automatically activated my Internet service and connected me to a Pacifica Software Web server. The software walked me through steps and choices where I set passwords and access and viewing privileges, for instance. Once those tasks were done, WebCalendar automatically launched my default Web browser, which I used to view my date book.

WebCalendar let me customize my calendar in a number of ways, such as changing the colors of fonts and links and adding icons to events (a knife and fork for a restaurant reservation, for instance) for easy association. And best of all, not once was I faced with any ominous HTML coding.

In its present form, WebCalendar is fairly limited. Although I was able to keep to-do and contact lists, those features aren't nearly as robust as what DTO 98 or even Ascend 97 has to offer. As much as I enjoyed using WebCalendar, I wouldn't want to rely on an Internet connection to get to my daily work schedule. Plus, after the first free year, you're charged $50 annually to post up to 20 calendars. Still, for some people WebCalendar could be a time saver. If you're in charge of a large carpool, for instance, you could post and update the schedule on the Web for the others in the pool to see, saving yourself a round of phone calls.

Speaking of cars, my PC has just notified me that it's almost time for my weekly encounter with the San Francisco parking authorities. As I look out the window, I see several cars parked in the street-cleaning zone, just begging for a ticket. If I were an altruistic person, I'd knock on my neighbors' doors and tell them they need to use a PC to get organized like me. But I can't. My computer just reminded me that I have another appointment in 10 minutes.

—*James A. Martin*

James A. Martin is a contributing editor for PC World. ■

F Y I

ALLENTOWN, Pennsylvania, leads the nation in trouble-free Internet connections, says a new report. In the most recent test period, the city had a successful dial-in connection on first attempt 95.6 percent of the time. Who's last? Phoenix, with a success rate of just 82.4 percent.

SOURCE: INVERSE NETWORK TECHNOLOGY

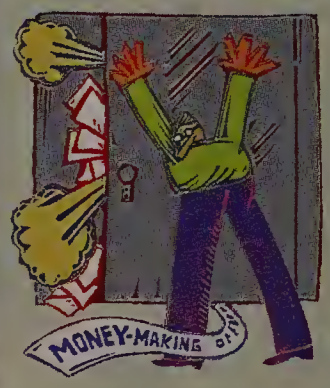
KEEPING UP

Gateway Opens Up Shop

WANT TO SEE, HEAR, and touch a Gateway 2000 PC before you buy it? Shoppers in Boston, St. Louis, and 14 other markets (primarily in the East and the South) can now stop by Gateway Country, a retail chain that the company is testing. The stores display everything from Gateway's Destination home-theater systems to notebook PCs to cow-spotted souvenirs. But you can't take a computer home—instead, you place an order, and one will be shipped to you. Gateway hasn't decided whether to expand the chain nationally. Go to www.gateway.com/country for a list of store locations.

Take Out the AOL Trash

MY AMERICA ONLINE in-box is so overrun with junk mail, I can't see the forest for the sleaze. To weed out those chain letters and icky ads, try the service's recently upgraded Mail Controls (go mail controls). You can block out all mail from outside AOL or from specific addresses, or you can opt to accept mail only from a predefined list of accounts. But AOL still offers fewer spam-prevention tools than most good Internet e-mail services. You can't, for instance, automatically deep-six messages that contain telltale keywords such as "money-making opportunity."



What's a Subwoofer?

WHEN IT COMES TO mysterious buzzwords, consumer electronics products are right up there with computers. For help in choosing that VCR, cellular phone, or car radio, you can pay a visit to SharpShopper (www.sharpshopper.com). For now, its main attractions are plain-English glossaries, buying tips, and a checklist that lets you compare products with the specs you want. The site is sponsored by retailers and manufacturers, but its features don't show any product biases. Starting in 1998, SharpShopper will help refer you to local retailers that stock specific products.

—Harry McCracken

ILLUSTRATIONS: RANDALL ENOS

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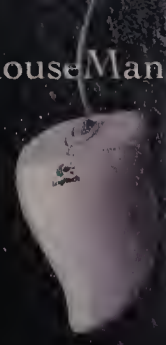

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Free Your Brain

Format Your Drive for a Faster Windows 95

PRACTICE SAYING these words: *Adios. Goodbye. I'm outta here. See ya 'round.* That's what you are going to say when I offer my next bit of advice. Ready?

Format your hard drive and start all over.

All right, calm down. Take a deep breath and count to ten. No, I haven't lost my senses. Wiping your drive clean isn't that radical an idea—and for you, unlike me, it's an elective procedure.

Here's the story: Not so long ago, my copy of Windows 95 crashed, courtesy of a page fault error (I thought I *was* on the right page). Then the blue screen appeared warning me that my system was busy or unstable, and the PC locked up. No big deal—and certainly not unusual, I thought. It was late in the day anyway, so I turned off the machine and set out on the long commute to the family room.

The next morning things got worse. Windows wouldn't load, and the error message turned nasty: The hard drive had trashed hundreds of files, a partition was gone, and I was in a world of pain. I hadn't a clue what happened—or why. Maybe, as the insurance policies say, it was an act of God.

Few of the scrambled files were filled with data, but my Windows and Program Files folders didn't fare so well. Most of my applications were kaput. Luckily, I was as prepared for disaster as the most technologically equipped Boy Scout.

I was as **prepared** for **disaster** as the most technologically **equipped** Boy Scout.

READY, SET, FORMAT C:

HERE WAS MY CHANCE to do what I'd wanted to do for years. No, not throw the machine out the window: Format the hard drive and start from scratch, reinstalling Windows 95 and all my applications.

There's a good reason to start anew. I've been upgrading my Windows versions for years. I went from DOS to Windows 3.0 and 3.1, Windows for Workgroups, and then Windows 95, followed by various service packs. My Windows folder held more history than *Encyclopaedia Britannica*—and at least a gazillion unneeded .dll files.

I'll admit that formatting the drive and reinstalling the applications gave me plenty of anxiety. And it was lots of work. But I can honestly say I'm ecstatic that I did it. Re-creating my system from ground zero resulted in a cleaner, significantly more stable machine. Specific problems—mystifying General Protection Faults, Invalid Page Faults, and skirmishing .dll files—all but vanished. I noticed a considerable performance gain, too: The system clearly runs faster now. And I pruned back about 200MB of useless applications I'd accumulated over the years. Overall, it was almost like having a new computer.

A few tips: To make things easier, consider reorganizing the data on your hard drive. For some excellent advice, check out "Hard Disk Housekeeping" in the October issue's troubleshooting guide. Then—and this is critical—make a full backup of your system, doing a file-by-file comparison to check its integrity.

Next, run every application, click on its *Help•About* button, and note the version on paper. Check whether you updated the program and if so where you stashed the upgrade disk. Play it safe and find the preceding version, too, because you may have to install it first (or at least be able to insert a floppy disk to prove that you're eligible for the upgrade). For shareware, look for and jot down the registration numbers.

It won't be easy, but try to find the files that hold your customizations. For example, I saved Word's custom dictionary files (go to *Tools•Options*, click the *Spelling* tab, then click *Dictionaries* to find them).

Don't forget to write down all your user IDs and passwords; your Internet service provider's phone number; and the IP, DNS, and gateway addresses set in Windows' Dial-Up Networking connections. If you asked Windows to remember a password but now can't remember it yourself, use the freeware Revelation utility (available at PC World Online) to see what's hiding behind the row of asterisks. Finally, try to account for anything else you'll need when reinstalling your programs. And consider dumping those files that aren't worth reinstalling.

The whole event felt so good to me that I'm going to repeat the process on my wife's machine. Oh Judy? Yoo-hoo...

Revelation

Free; SnadBoy Software; www.snadboy.com

Find files from this article at www.fileworld.com. Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. See page 14 for contact information. ■

ILLUSTRATION: RANDALL ENOS

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Horiz. Scan Freq.	30-95kHz	30-86kHz	30-95kHz	30-85kHz	30-70kHz	30-70kHz	30-70kHz	30-70kHz	30-54kHz	30-48kHz

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Estimated maximum retail value of prizes: Grand Prize (1) $10,000 (alternative: $10,000); Biweekly Prize (26): $200 each. One Biwe Prize is drawn every two weeks from eligible entries received for biweekly drawing. Total maximum retail value of all Game Roo prizes: $15,200. Odds of winning are determined by the total numbe eligible entries received for each drawing. Entry distribution estimated to exceed 500,000,000.

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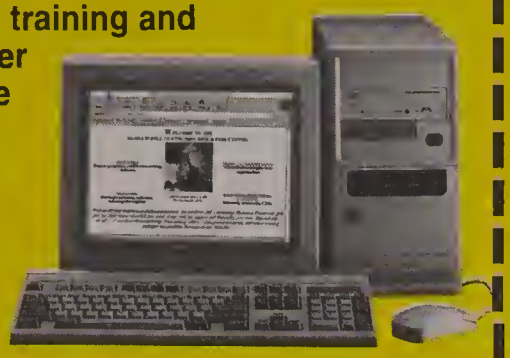

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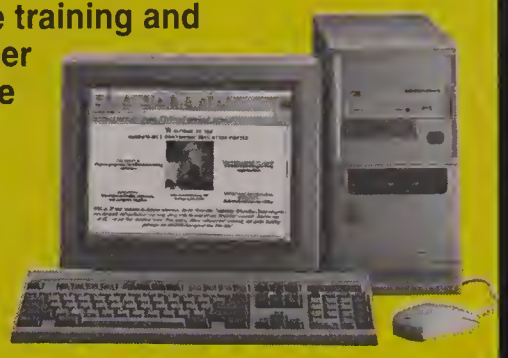

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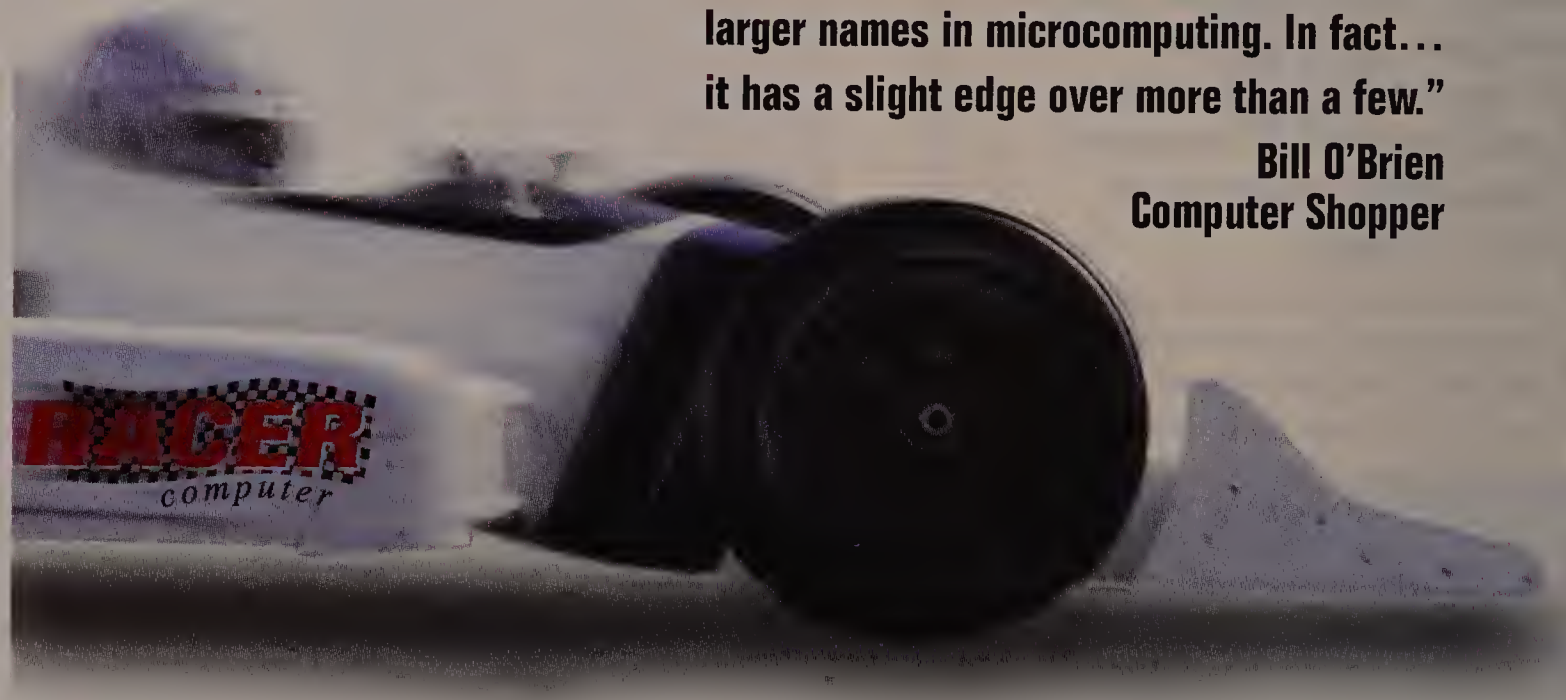

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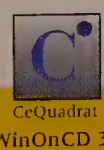

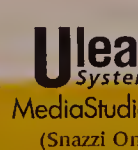

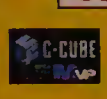

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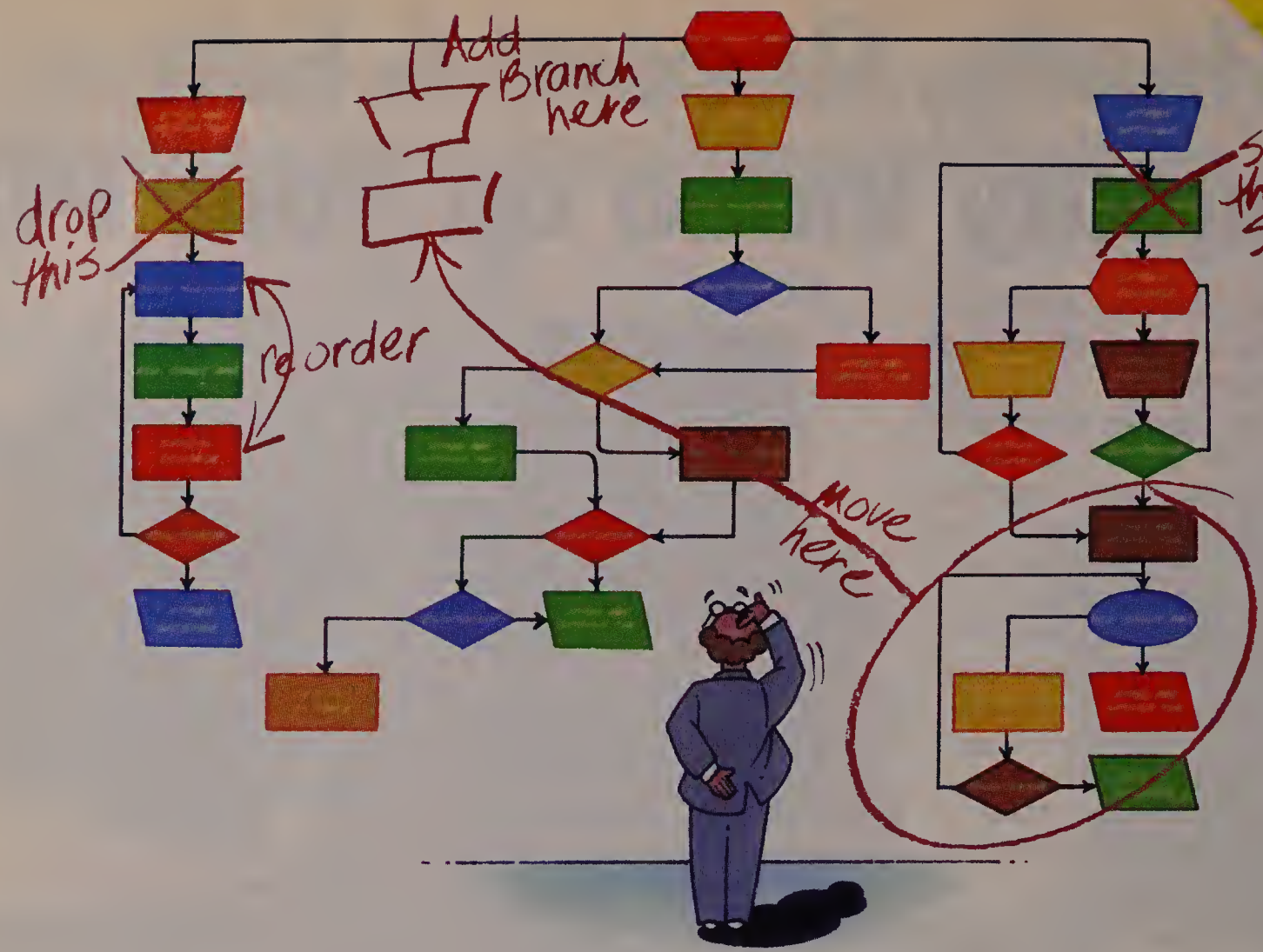

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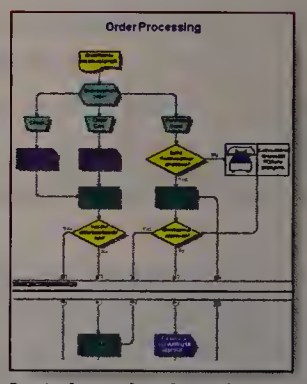

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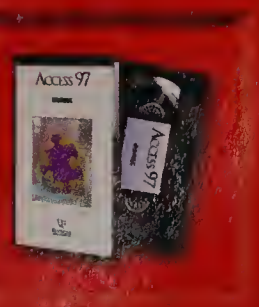

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HERE'S HOW

ANSWER LINE

Turn Your PC Off at Night

CAN YOU ANSWER a much-discussed question? Some of my coworkers turn their computers off before leaving work, but others keep them on with a screen saver running. At the end of the day, should you leave a PC on or turn it off?

Name withheld, Internet

EVERY COMPUTER-MAGAZINE Q&A columnist faces this question eventually. And this one says: Turn it off.

Some argue that you should turn off your PC at night because constant use wears it out. But others believe that turning your PC on and off regularly will wear it out faster than leaving it on. Well, I've seen PCs fry from power surges, burn from overheating, and smash to the floor. More often I've seen them become obsolete. But I've never seen one wear out.

Some people have to keep their computers on all the time. For instance, if you give your fax number to business associates and you don't have a dedicated fax machine, your PC should be ready to receive faxes at all times.

Generally speaking, though, running an unused computer is just a waste of electricity. Besides, shutting down once a day may make things run more stably, since that's the only way to ensure that Windows gets back all the memory used by applications.

CHANGE FILE NAMES EN MASSE

CAN I CHANGE a group of file names with one command? Say I have ten files in a folder; can I rename them from file1, file2, file3, and so on to misc1, misc2, misc3, etc.?

John Whitten
Ocean Springs, Mississippi

YES, AS LONG AS you've been using short, DOS-compatible file names—those that are no more than eight characters long and don't contain spaces or the characters \ / : * ? " < > |. Also, all of your file names must have a text string in common. The example you gave me fits both criteria, since all the names are five characters long, contain only numbers and letters, and start with the word *file*.

To rename your files, go to a DOS prompt and change to the directory where the files reside. There, use the ren command to rename the files. The command's syntax is **ren** *oldname newname*, and you should use the DOS wild cards **?** (for any character) and ***** (for any string of characters) to represent the parts of the file names that vary. So if you want to rename file1.rpt, file2.rpt, and file3.rpt to misc1.rpt, misc2.rpt, and misc3.rpt, you'd use the command **ren file?.rpt misc?.rpt**. For your example, use **ren file* misc***.

In theory, a DOS session running inside Windows 95 understands long file names, but in this case the theory doesn't work: A long file name containing a wild card will just confuse DOS. If you've got long names you want to change en masse, you'll need a program like Kent H's Rname-it. The interface is clunky (see **FIGURE 1**), but it works fine and it's free—and

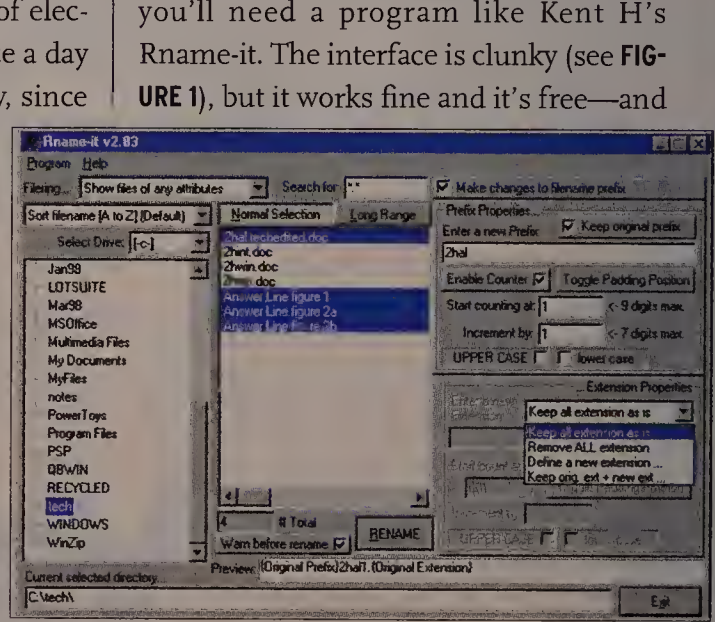


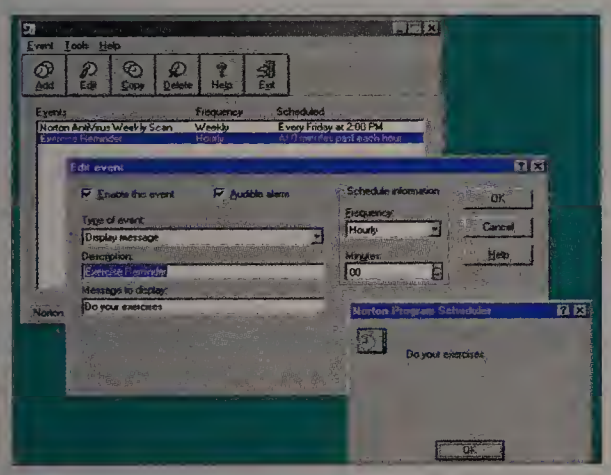
FIGURE 1: RENAME SEVERAL FILES IN ONE STEP, even those having Windows 95's long file names, with Rname-it.

ILLUSTRATION: JAMES YANG

Take a Break With Anti-Virus

YOU PROBABLY KNOW that non-stop typing and mousing isn't good for your eyes, arms, and the rest of you. One of the best ways to prevent injuries from too much computing is to take a break every hour or so and do some hand and neck exercises. There are plenty of programs that will remind you to exercise at set intervals.

But if you're using Norton Anti-Virus, you've already got such a program. You can set up NAV's Norton Program Scheduler to pop up with a reminder every hour. Inside the program, click the *Add* button. For 'Type of event', select *Display message*. For Description, enter something like **Exercise Reminder**, and for the message, **Do your exercises**. Select *Hourly* in the Frequency drop-down list, and



specify **0** in the Minutes box. Click *OK* twice and minimize the program.

Just make sure Norton Program Scheduler is in your Windows\Start Menu\Programs\StartUp folder so it will always be running.

unlike anything put out by Microsoft or Lotus or Netscape, Rname-it doesn't alter Windows when you install it. You can find the program on PC World Online.

CD-ROM UTILITIES FOR FLOPPY WINDOWS

WHEN *PC WORLD* refers to utilities that come with Windows 95, you always tell us where to find them on the Windows 95 CD-ROM. I bought my Win 95 upgrade on floppies, and I have no idea which disk might hold a referenced utility.

Jerry Connett, Des Moines, Iowa

THE FLOPPY DISK VERSION of Windows 95 doesn't come with System Monitor, ClipBook, or many of the other useful utilities you can find on the CD-ROM. But Microsoft does make them available for downloading from its Web site, and you can find them all on PC World Online. You can also buy them from Microsoft by calling 800/426-9400. These utilities are the same in all versions of Windows 95.

LITTLE FILES MEAN A BIG WASTE OF SPACE

AFTER READING "How to Keep Your PC Trouble-Free" (October 1997), I downloaded the DiskData program to check the hard drive space on my Dell Dimension XPS M200s. I had assumed my PC was running FAT32, but I discovered it was plain ol' FAT, with 32KB clusters.

I collect a lot of .txt files averaging 5KB each, which means I'm wasting a lot of space. Other than partitioning, what can I do?

Donald Holtzinger
Walnutport, Pennsylvania

UNLESS YOUR PC is running the new FAT32 file system (available only in Windows 95 OSR2) or NTFS (available only in NT), your little files will take up a lot of space. If the hard drive's capacity is between 512MB and 1GB, every file takes up at least 16KB, even if the file itself is only 1 byte. If the drive is 1GB or more, each file takes up at least 32KB.

The usual way to deal with this waste is to separate your disk into smaller partitions, each of which DOS and Windows see as a separate drive. (For more on partitioning, see the October article.) But if you don't want to do that, I don't blame you. Partitioning is a scary process that requires you to rethink the way you organize data.

If you're just concerned about the waste caused by a large collection of tiny files, the easy solution is to compress them all into one big file. Even on an efficient FAT32 system, you'll save at least 50 percent of your disk space. On a large FAT16 partition, you'll save more. To see just how much more, I created a folder with 86 .txt files between 5KB and 6KB each—a total of 437KB. With my hard drive's 16KB clusters, the actual total came to well over 1MB; if I had your 32KB clusters, it would approach 3MB. But the 186KB .zip file I created took up only 192KB of space (see **FIGURE 2**).

A standard compression utility like Nico Mak's WinZip will handle the job fine. It's available on PC World Online and costs $29 to register. If you want to search your compressed files easily, however, consider Mijenix's FreeSpace. Windows sees ▶

	Actual file size	Size on FAT16 system with 1GB+ drive (32KB clusters)	Size on FAT16 system with 512MB to 1023MB drive (16KB clusters)	Size on FAT32 system (4KB clusters)
86 files	437KB	2.69MB	1.34MB	344KB
1 .zip file	186KB	192KB	192KB	188KB

FIGURE 2: COMPRESSING SEVERAL SMALL FILES into a single large one saves lots of wasted cluster space.

By Lincoln Spector

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files compressed by FreeSpace as if they're not compressed at all, which allows you to search them, load them into applications, and do anything you'd do to a normal file. In reality, all the compressed files in a folder are stored in one file, saving clusters. (For more details, see *New Products*, December 1997.)

If you'd rather not compress anything, you can simply cut and paste all those little files into one big one.

NAVIGATOR WASTES SPACE, TOO

IN "CUT DOWN on Your Browser's Cache" (*Answer Line*, September 1997), we reported that Netscape Navigator caches all visited sites to one file—a more efficient method than Microsoft Internet Explorer's, which saves every file separately.

But Guy Simmons of Ilford, Essex, England, points out that Navigator stores each file separately, too, wasting as much space as Internet Explorer. If you're using Navigator 3.*x*, you'll find these files in Program Files\Netscape\Navigator\Cache. For Communicator 4.0, they're in Program Files\Netscape\Users*your name*\Cache. Thanks for the catch, Guy.

HARD DRIVE NEEDS POWER, WRITER NEEDS HELP

IN DECEMBER'S *Answer Line*, I gave some bad advice to Terry Shanklin ("Hard Drive Needs Power"), who appeared to have a bad connection between his power supply and his hard drive.

I suggested that he test the problem by swapping the power cables between his hard and floppy drives. Several readers pointed out that floppy drives and hard disks use different types of power connectors. What I should have recommended was swapping the cables between the hard disk and *CD-ROM* drive.

Unfortunately, that wasn't the end of my bad advice. I also told Shanklin that if the cable did prove bad and he had no unused power cables in his system, he needed to replace his power supply. As Bill Yu of St. Louis pointed out, you can buy a Y splitter that turns one good power cable into two. Costing less than $5 in many stores, these splitters are cheaper than a new power supply, and they're easier to install, too.

Thanks, Bill. I stand humbled.

- **FreeSpace 1.0 $50 street; Mijenix; 800/645-3649, 608/277-1981; www.mijenix.com**

READER SERVICE NO. 670

- **Windows 95 utilities $9.95 plus $5 shipping on floppy disk, $20 plus $5 shipping on CD-ROM; Microsoft; 800/426-9400; www.microsoft.com**

READER SERVICE NO. 671

- **WinZip 6.3 $29 list; Nico Mak Computing; www.winzip.com**

READER SERVICE NO. 672

Find files from this article at www.fileworld.com. Answer Line *welcomes your questions and tips and pays $50 for published items. Lincoln Spector is a* PC World *contributing editor.* *See page 14 for contact information.*

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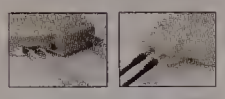

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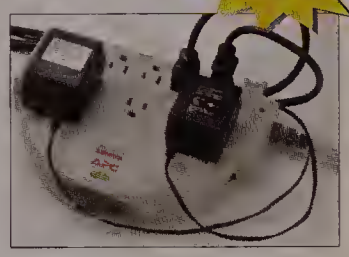

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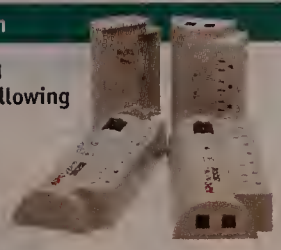

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Speed Through Your Net Neighborhood

95 ARE THERE SERVERS, files, or folders on your network that you use frequently? For quick access, you can make desktop Shortcuts to these items. But if your desktop is already cluttered, do this instead. Use the right-mouse button to drag folder, file, computer, or even printer icons to the Network Neighborhood icon (as in the top half of **FIGURE 1**). Release the mouse button and choose *Create Shortcut(s) Here*. The next time you look in the Network Neighborhood window (see the bottom half of Figure 1), you'll see an icon you can use for quick access.

The catch? You can't create Shortcuts to files or folders on your own PC by dragging them here. But any Shortcuts you create in the Windows\NetHood folder will show up in Network Neighborhood.

RECORD YOUR EVERY MOVE

ALL Versions THERE'S NO FASTER way to perform a routine task than with a macro, and there's no easier way to create a macro than with Windows' Recorder. This Windows 3.*x* tool allows you to record your keystrokes and mouse movements, then play them back in any application by pressing a key. It's great for programs that don't have macro abilities of their own.

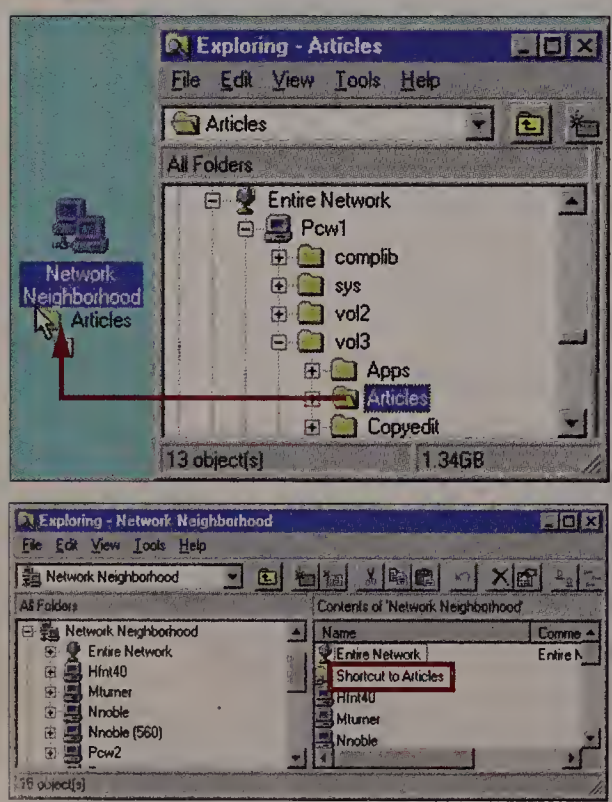


FIGURE 1: WITH JUST a drag and drop, you can add frequently used items to Network Neighborhood.

Windows 95 and NT 4.0 users can make use of Recorder only if they've upgraded from Windows 3.*x*. If you can't find recorder.exe on your hard drive, look for recorder.ex_ on your original Windows 3.*x* floppies. Then type **expand recorder.ex_** at the DOS prompt, and follow the on-screen instructions to reinstall it.

Here are some tips to get you going:

Set the stage. To avoid false starts and other problems when recording the macro, you need to set up conditions to match those in which you'll use it. For example, if you're recording a macro to insert a special character, open your page layout application or word processor with the cursor placed at the character-insertion point. Then start Recorder and choose *Macro•Record*.

Choose the key. When assigning shortcut keys in the Record Macro dialog box (shown in **FIGURE 2**), take care to choose keys that you don't use for other purposes in any other application. Recorder will take over these keys any time you have this macro file open; performing the macro's actions will be the only thing those keys do. While you're in this dialog box, make sure *Enable Shortcut Keys* is checked, and choose *Fast* for Speed in the Playback area.

Record locally, play globally. If there's a chance you'll need these keystrokes in more than one application, choose *Any Application* under Playback in the Record Macro dialog box.

Prevent macro mania. Recording mouse movements in any Recorder macro can cause problems if the playback conditions aren't identical to the recording conditions. To avoid that problem, choose *Ignore Mouse* from the Record Mouse drop-down list in the Record Macro dialog box. When recording, use only the keyboard to handle the task you're recording. If you need to open the File menu, for example, you'd press **<Alt>-F** and then press the arrow keys to select a menu item.

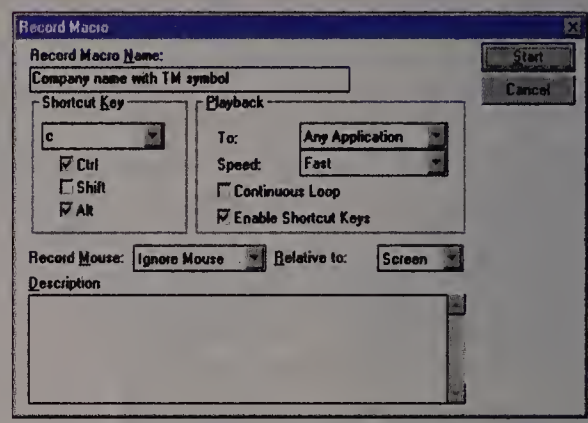


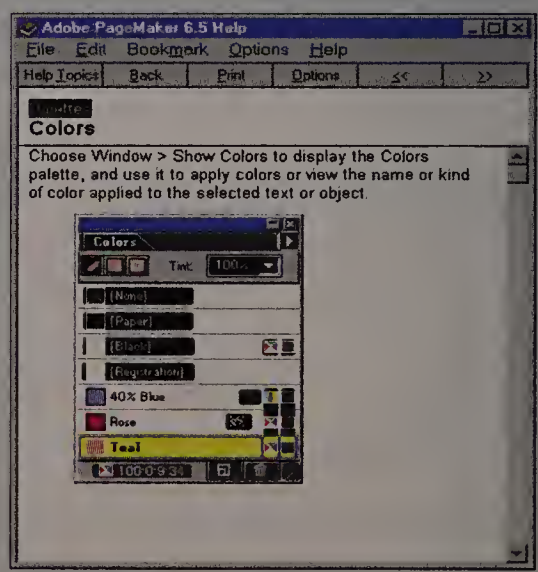
FIGURE 2: AUTOMATE KEYSTROKES and mouse moves by recording them in Windows' Recorder.

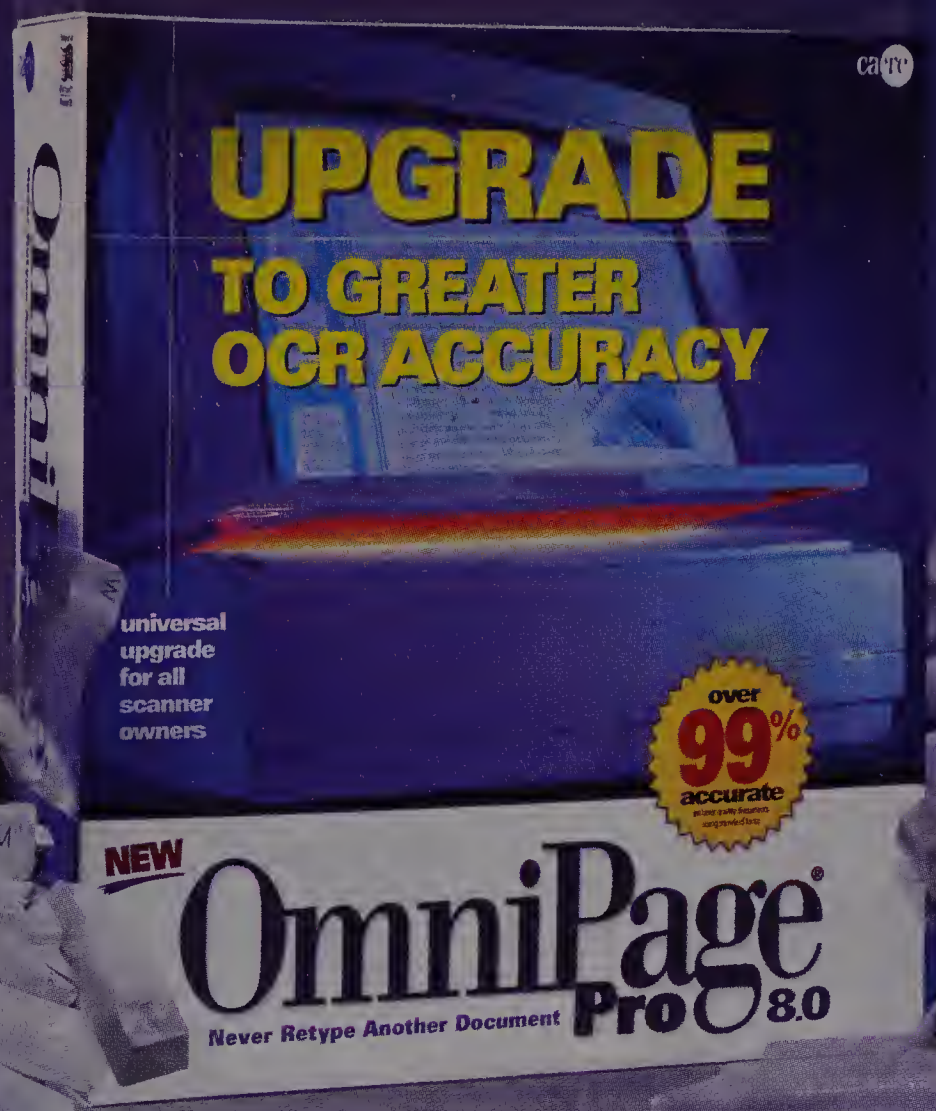
Action! When you've set up the Record Macro dialog box exactly to your liking, click *Start*.

Keep your tools handy. When you've finished recording, click the minimized ▶

Uncover Hot Spots in Help

ALL Versions WINDOWS' HELP FILES make it easy to find links to related topics: Just look for the colored and underlined text. But many Help files also let you jump to related topics by clicking *hot spots* in embedded graphics. To see all the hot spots at once (as in the figure), simply hold down the **<Ctrl>** and **<Tab>** keys together.





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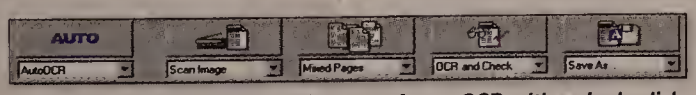

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Circle 91 on reader service card

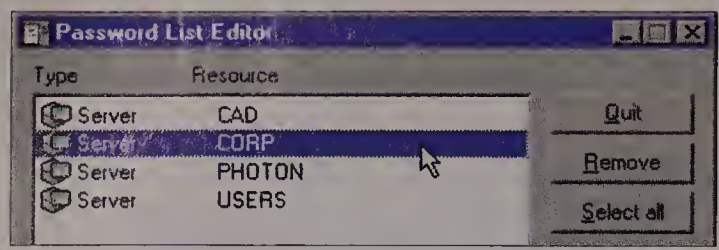


FIGURE 3: INCREASE SECURITY by removing memorized passwords so you'll be prompted each time you log in.

Recorder icon (Windows 3.*x*) or the Taskbar button (Windows 95 and NT 4.0). Select *Save Macro* and click *OK*. Click the *Recorder* icon or the Taskbar button again to open the Recorder dialog box, then choose *File•Save*, type a name for your macro file, and click *OK*.

If you think you'll need this macro every day, locate the file you just created in Windows 3.*x*'s File Manager or Win 95's or NT's Explorer. In Windows 3.*x*, drag the file into your Program Manager Startup group. In Explorer, hold down the right mouse button while you drag the file into the StartUp folder (usually Windows\Programs\StartUp), then release the mouse button and choose *Create Shortcut(s) Here*.

To start Recorder minimized in Windows 95 or NT, right-click the icon or Shortcut, click the *Shortcut* tab in the Properties dialog box, and select *Minimized* from the Run drop-down list.

MAKE WINDOWS FORGET YOUR NETWORK PASSWORDS

IF YOU ROUTINELY log in to network resources, you probably know you can avoid entering a password each time you go in to Windows. When you type your password, check *Save this password in your password list*. Windows won't prompt you again.

But that's just the problem: What if you change your mind and decide you want your workstation to be a little more secure? To delete a stored password, you need the Password List Editor. If you haven't already installed this utility, pop in your Windows 95 CD-ROM and choose *Start•Settings•Control Panel*. Double-click the *Add/Remove Programs* icon, and click the *Windows Setup* tab. Click *Have Disk*, and in the list box type **d:\admin\apptools\pwledit** (replace the 'd:' with your CD-ROM drive letter if it's different). Click *OK*. Check the box for *Password List Editor* and click *Install*. Close the Add/Remove Programs Properties dialog box.

The rest is easy: Choose *Start•Programs•Accessories•System Tools•Password List Editor*. Select the network resource whose stored password you want to delete, or click *Select all* to delete them all. Then click *Remove* (see **FIGURE 3**). The next time you log in to the resource, you'll be prompted for your password.

SMART USERS, TOOLISH CHOICES

THERE'S ONE WAY in which Windows for Workgroups 3.11 is better than the other versions—even Windows 95 and NT: You can customize its File Manager toolbar so that it includes only those features you want, in any arrangement.

Here's what to do. First, make sure that the toolbar is visible (if it's not, choose *Options•Toolbar*). Now choose *Options•Customize Toolbar*, or simply double-click a blank area of the toolbar. The list on the right shows the buttons you already have; on the left are buttons you can choose from (see **FIGURE 4**). You can click *Add*, *Remove*, *Move Up*, and *Move Down* to change the composition and order of your buttons. But it's faster just to drag and drop buttons between the lists—an arrow next to the right-hand list shows where your button will appear when dropped.

Don't forget to drag Separators to the list on the right to adjust the spacing between toolbar buttons. Adding Separators is a handy way of grouping similar features, making it easier to find the button you want.

If you change your mind, the *Reset* button will return the toolbar to its default arrangement. Finally, be aware that all changes are instantaneous: To get a look at how your customizing is going, drag the Customize Toolbar dialog box out of the way so you can see the effects of your work in File Manager.

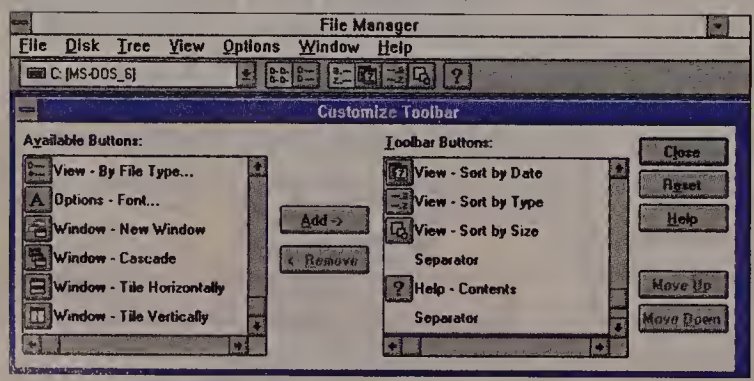
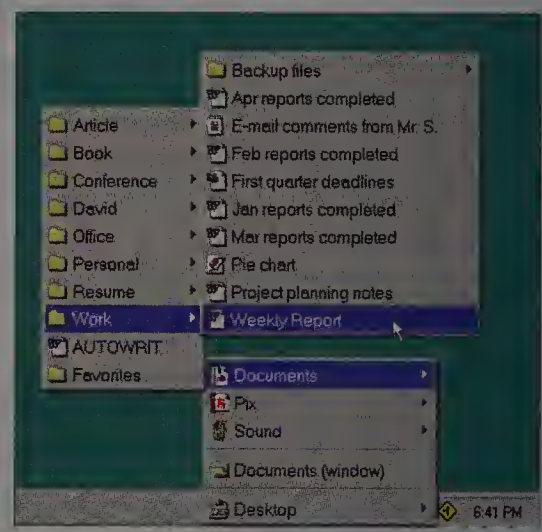


FIGURE 4: CREATE A BETTER TOOLBAR in Windows for Workgroups 3.11's File Manager.

WINDOWS TOOLBOX

Find Documents Fast With WinGo

WHY IS IT THAT THE DOCUMENT you want is always 37 mouse clicks away? Shortcuts to files in the Start menu need constant updating, Shortcuts to folders still require clicking and scrolling, and the Documents menu never has what you need. These are all good reasons to try WinGo from MetaProducts. Just click its tray icon (or use a hot key) to get a customizable menu of folder Shortcuts or submenus that display the contents of your favorite folders. Another menu gives you access to items on the desktop. WinGo works with Windows 95 and NT, costs $22 to register, and is available on PC World Online



SET YOUR PRIORITIES IN WINDOWS NT

ALL APPLICATIONS are not created equal: When running several programs at once in Windows NT 4.0, the active (foreground) app, by default, gets the most processing oomph.

But it doesn't have to be that way. You can give equal time (or any proportion of it) to applications that are running in the background, so their tasks will finish a little sooner. ▶

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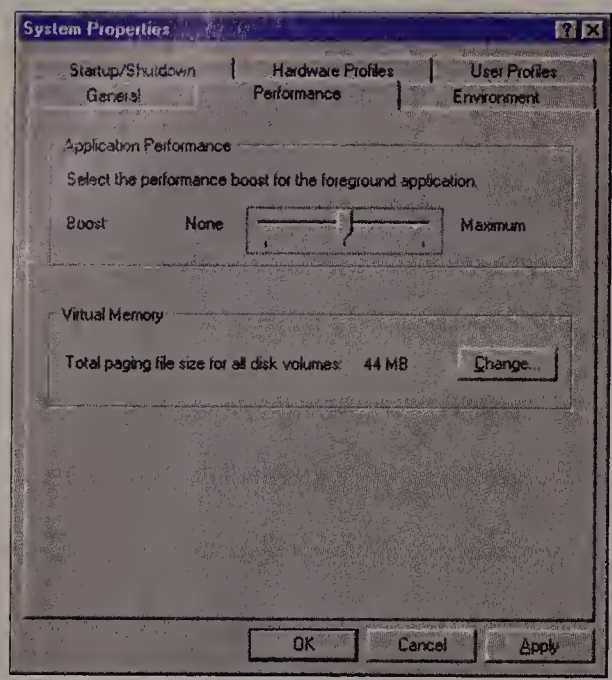


FIGURE 5: SET YOUR OWN PRIORITIES for multitasking applications in Windows NT 4.0.

Choose *Start•Settings•Control Panel.* Double-click the *System* icon and click its *Performance* tab. Use the Boost slider bar to balance processor time between the foreground and background applications (see **FIGURE 5**). Setting it all the way to *None* gives equal priority to all applications. To give more to background applications, move the slider toward the middle.

Experiment with the settings until you get the responsiveness you want from active applications while still getting more out of background tasks. Then click *OK.*

HOW BIG IS THAT FILE?

I MISS THE UNIX DU command for summing up the disk space used by a directory and all of its subdirectories. Now that I use Windows 95, I'm wondering if there is a way to click on a folder and find out how much space it and its subfolders are using.

John Donovan, Chico, California

NO PROBLEM. In either Windows 95 or NT 4.0, just right-click on any drive or folder and choose *Properties.* The Properties dialog box shows the total size of the selected object, and even tells how many files and folders are in the selection.

But you needn't limit yourself to a single folder and its contents. You can also select multiple objects (hold down the **<Ctrl>** key as you click individual folders or files) and use this same technique to find out the total disk space occupied by the selected items. This is useful when you need to recover disk space and are looking for files and folders to delete. Opening the Properties dialog box for a drive provides an added bonus: Both Windows 95 and NT 4.0 display a pie chart showing free and used disk space.

online *Find files from this article at www.fileworld.com.* Windows Tips *pays $50 for published questions and tips. Contributing Editor Scott Dunn is a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444).* *See page 14 for contact information.* ■

Shut Down Windows Automatically

I HAVE MY Windows 95 PC on a timer that turns it on and off at certain times of the day. I use Microsoft Plus's System Agent tool to automate my applications; for example, it starts my fax software when I'm away. I'd like to be able to shut down Windows 95 properly before the timer turns off the computer. Can you help me?

Alonzo Peterson, Internet

Using an inexpensive timer in conjunction with the Microsoft Plus System Agent is a great way to automate Windows 95 to do your work without your having to set foot near the PC—and without spending a lot of money. But there is one problem: How do you get Windows 95 to shut itself off?

The answer is to set up System Agent to launch a batch file that puts your computer into MS-DOS mode—the Windows equivalent of exiting to the DOS prompt. Here's how to do it:

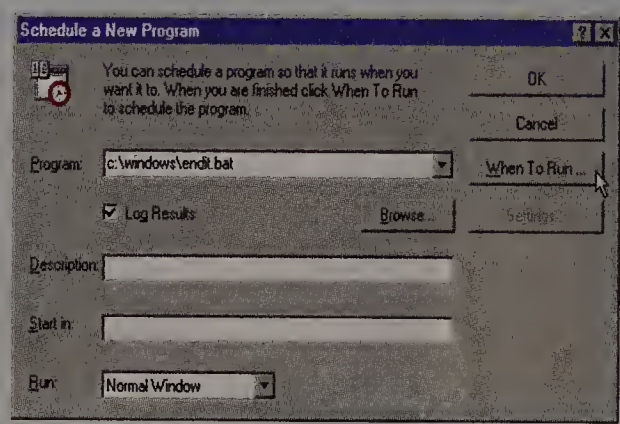
1. Start Notepad (or another text editor) and create a batch file containing one line:

start c:\windows\byebye.pif

Save it with a name like **endit.bat** in a folder of your choice, and exit Notepad. Using Windows' Explorer, locate the icon for endit.bat. Right-click the icon and choose *Properties.* Click the *Program* tab in the Properties sheet, and check *Close on Exit.* Click the *Misc* tab and uncheck *Warn if still active* under Termination. Then click *OK.* A new DOS Shortcut icon will appear in the folder.

2. Create a DOS Shortcut file by copying the endit.bat Shortcut you just created. Hold down the right mouse button while you drag endit.bat to a blank area of the folder, and choose *Copy Here.* Click the new icon's name and change it to **byebye.** (Windows hides its extension—the real file name is byebye.pif.) Right-click the byebye Shortcut and choose *Properties.* Click the *Program* tab and edit the 'Cmd line' box so that it reads **c:\windows\command.com /k echo Safe To Shut Down Computer** (adjust the path to fit the location of your command.com file). This starts a DOS prompt with a screen message that it's okay to power down. The /k switch prevents the DOS mode from ending at the moment the message is displayed.

Now click the *Advanced* button and check *MS-DOS mode.* Then uncheck *Warn before entering MS-DOS mode.* Click *OK* twice to close the dialog box and Properties sheet.



3. Finally, right-click the *System Agent* icon at the far end of the Taskbar and select *Open.* In System Agent's dialog box, select *Program•Schedule a New Program,* and in the Program box (shown in the figure above) type the path to endit.bat (or whatever you named your new batch file). The other settings in this dialog box aren't important, but you can also add a Description if you like. Click *When To Run* and specify a time—presumably just before the timer shuts off the juice to your computer. When you're through, click *OK* and exit System Agent.

When System Agent runs your batch file, it will launch the Shortcut that shuts down all Windows applications and restarts the PC in a DOS-only mode, so it's safe to power down. This trick will work only if at the appointed time no applications are running that require input before closing—for example, Lotus cc:Mail, which gives a confirmation prompt before exiting.

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High-performance 7VX- 95KHz

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PITCH (MM)	0.28	0.25 A.G.	0.26	0.28
VIEWABLE AREA	19.9"	16.1"	15.8"	13.8"
H-SCAN (KHZ)	30-117	24-82	30-95	30-70
V-SCAN(HZ)	50-120	50-120	50-120	50-160
MAX. RESOLUTION	1600X1200	1600X1200	1600X1200	1280X1024
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When a Blank Is Not a Zero

I HAVE AN EXCEL worksheet that uses a formula to look up a value in a table. The formula =vlookup (B1,D1:E13,2) searches the lookup table in D1:E13 for the value in cell B1, then retrieves the value from the second column of the table. Not every cell in the table has a value (intentionally), and some of the cells contain a zero. My problem is that the Vlookup function returns a zero when the corresponding cell in the lookup table is actually blank. Is there any way to get my formula to return a blank rather than a zero?

Jeffrey T. Barnett, Belleville, West Virginia

AS YOU'VE DISCOVERED, lookup functions treat empty cells as zeros. But I've found a solution to your problem.

After playing around a bit, I discovered that by adding a few more functions to your formula, you can get it to distinguish between zeros and blanks. The formula below, which uses the Len function to calculate the length of the looked-up value, returns a zero when the value is blank, and the actual length when it isn't blank:

=len(vlookup(B1,D1:E13,2))

Then, by adding the If function, you can get the formula to display an empty string (a blank) whenever the length of the looked-up value is zero, as in **FIGURE 1**, and the actual value whenever the length is anything but zero. Enter the following formula in cell B2:

=if(len(vlookup(B1,D1:E13,2))=0,"",
vlookup(B1,D1:E13,2))

Unfortunately, this technique doesn't work with 1-2-3 or Quattro Pro.

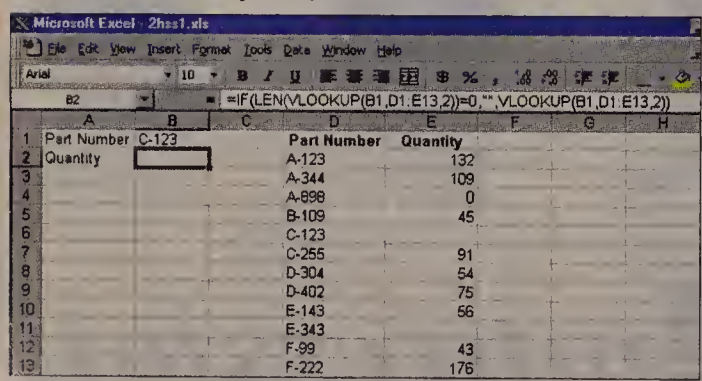

FIGURE 1: TO FORCE A VLOOKUP FORMULA to return a blank instead of a zero, add Len and If functions.

FORMAT DATES FOR THE 21ST CENTURY

MY OFFICE recently switched from 1-2-3 to Excel, and many of my colleagues miss the way 1-2-3 formats 21st century dates. In 1-2-3, the normal format is mm/dd/yy (2-digit years). But if the year is 2000 or later, it uses the format mm/dd/yyyy (4-digit years).

I came up with a custom number format for Excel that mimics the way 1-2-3 does it:

[>=36526]m/d/yyyy;
[<36526]m/d/yy;General

If the date is greater than or equal to January 1, 2000 (date serial number 36526), Excel uses the 4-digit format. If it's earlier, Excel uses the 2-digit format.

Wes Stillwell, Williston, North Dakota

MANY USERS haven't explored Excel's custom number formats, which use codes to specify how the contents of a cell will be displayed. A custom format can have up to four sections, separated by semicolons, which define the formats for positive numbers, negative numbers, zero values, and text (in that order).

You can also perform simple conditional numeric formatting, as Wes has done (see Excel's online help for more information).

To enter a custom number format in Excel 97, select *Format•Cells* and click the *Number* tab in the Format Cells dialog box. Select *Custom* from the category list, and type the format in the Type box.

REMOVING EMPTY ROWS: OTHER WAYS

IN OCTOBER I presented an Excel macro to delete all empty rows in a worksheet while maintaining the order of the rows. Several readers described another technique that works with any spreadsheet.

Open the worksheet you want to clean up. Insert a new column A and fill it with consecutive integers (see **FIGURE 2**). Then sort the data by any other column to place the blank rows at the bottom. Do this until all blank rows are at the bottom. Delete the integers from the blank rows in column A, resort by column A, then delete column A.

Others use Excel's AutoFilter: Insert a new row 1, and select that row plus all your data. Then choose *Data•Filter•AutoFilter.* At the top of each column, select *(Blanks)* from the drop-down list (see **FIGURE 3**).

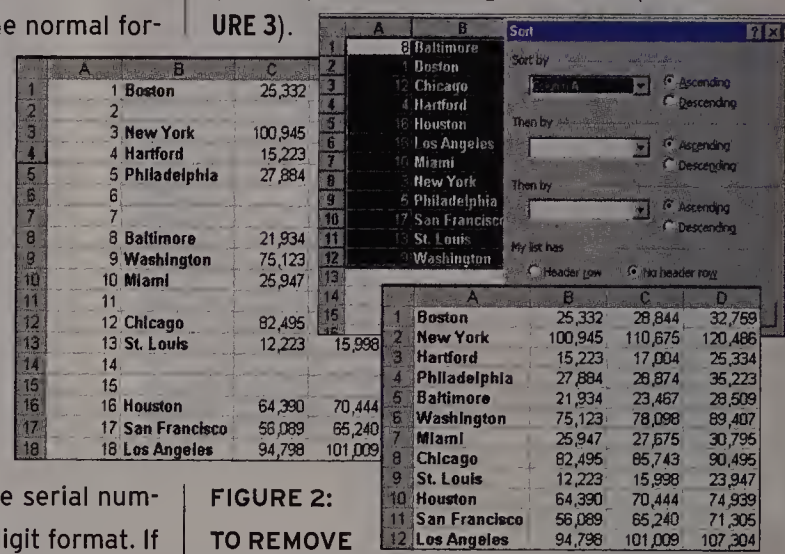

FIGURE 2: TO REMOVE EMPTY ROWS, add a column of integers, sort by another column to force blank rows to the bottom, delete the blank rows, then resort.

With the data still selected, choose *Edit•Delete Row* to get your original data minus the empty rows. Insert a blank row so your first row of data isn't deleted.

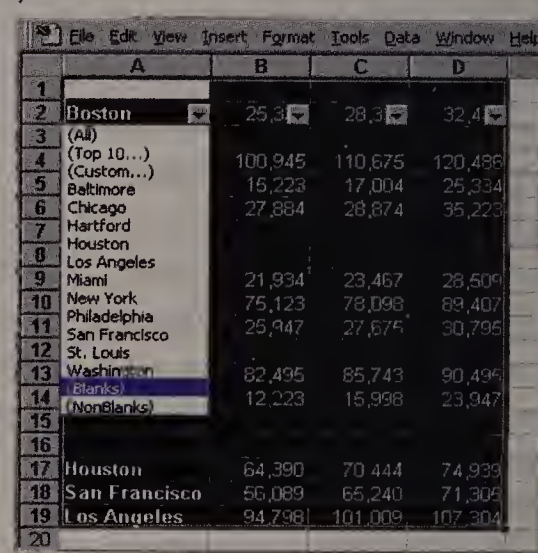

FIGURE 3: ANOTHER WAY: Excel's AutoFilter lets you hide nonblank rows, then delete them.

Spreadsheets welcomes questions and tips and pays $50 for published items. Contributing Editor John Walkenbach is the author of nearly two dozen spreadsheet books and maintains The Spreadsheet Page *(www.j-walk.com/ss/). See page 14 for contact information.* ■

Introducing *monstrous* screens to show off your *monumental* ideas

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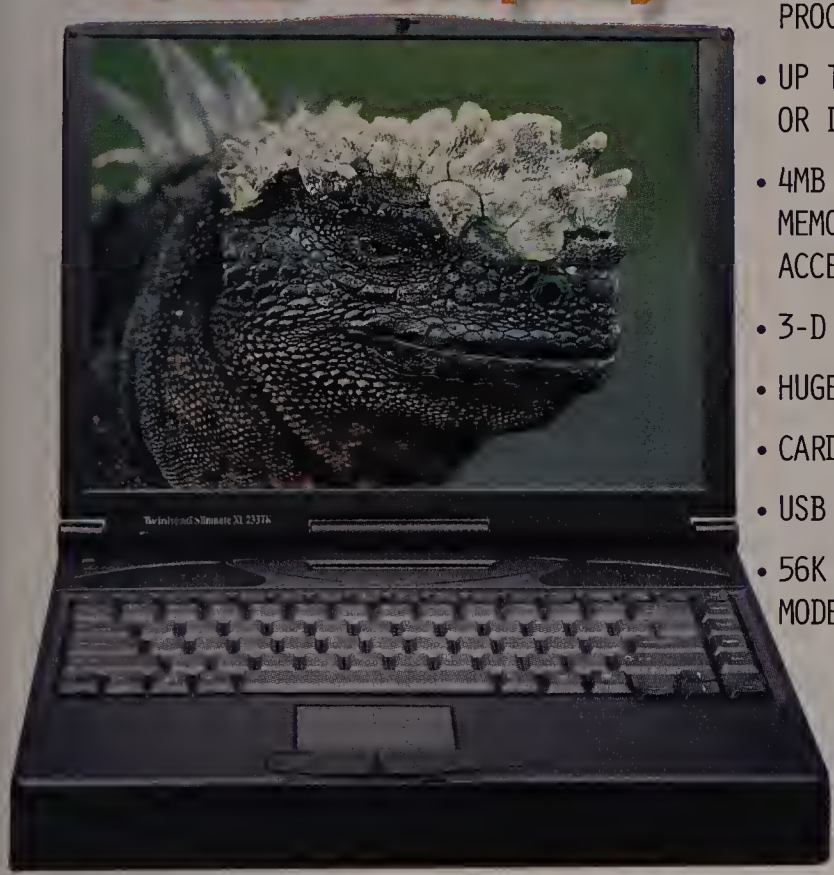

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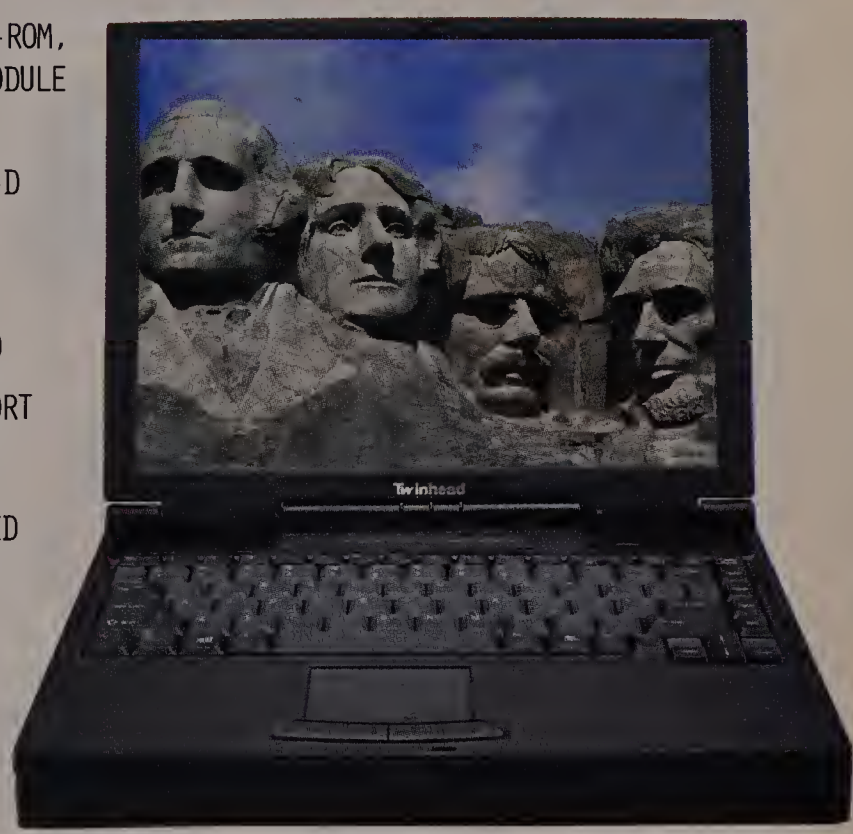

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Clean Up Text Files (Again)

SOMETIMES WE ALL have to import plain-text files into our word processors. Whether they come from e-mail messages or from other sources, text files almost always contain carriage returns at the end of each line, which makes them difficult to read and a pain to edit.

In October's column, we showed how to create a simple Word macro to clean up text files. But Suzanne Barnhill of Fairhope, Alabama, came up with a better method that uses Word's AutoFormat function.

WordPerfect and Word Pro have similar functions, but they aren't easy to find. Here's a guide to cleaning up text file formatting in all three word processors. (**FIGURE 1** illustrates how to do this in Word.)

Word 6.0, 95, and 97: Open the text file or insert it from the Clipboard, and select *Format•AutoFormat*. If you're working in Word 97, select *AutoFormat now* in the AutoFormat dialog box, and choose the most appropriate type of document from the document type list. Click *OK*.

In Word 6.0 and Word 95, click *OK* in the AutoFormat dialog box, then click *Accept* in the next dialog box. Save the file with a new name.

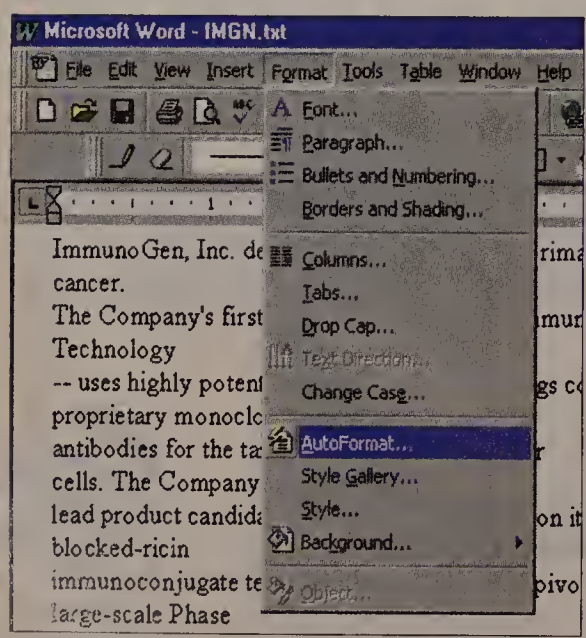
Word automatically formats short lines in converted files with heading styles—including widows and items in a list. You can quickly reformat these, where necessary, after the fact.

WordPerfect 6.1 and later: Select *File•Open*. In the Open File dialog box, select *Text Files (*.txt)* from the 'File type' list. Choose the desired file and click *OK*. In the Convert File Format dialog box, choose *ANSI (Windows) Text CR/LF to SRt* or *ASCII (DOS) Text CR/LF to SRt* in the 'Convert file format from' list, depending on the source of your file. If you're unsure, choose either one. Click *OK*. Save the file with a new name.

WordPerfect does a pretty good job of intelligently deciding where paragraphs end. You may still have some manual cleaning up to do, however.

Word Pro (all versions): Select *File•Import/Export*. In the Import or Export dialog box, mark the options you want (usually the defaults), then click the *Text Options* button. In the Text File Options dialog box, select the *Carriage return and line feed after each line* option. Ignore the 'Character set' list, if shown. Click *OK*, then click *Import*. In the Open dialog box, choose the desired file, and click *Open*. Save the file with a new name.

After converting the text file, you may have some minor reformatting to do, especially if the text file contained numbered lists. But Word Pro does a good job of converting normal text paragraphs.



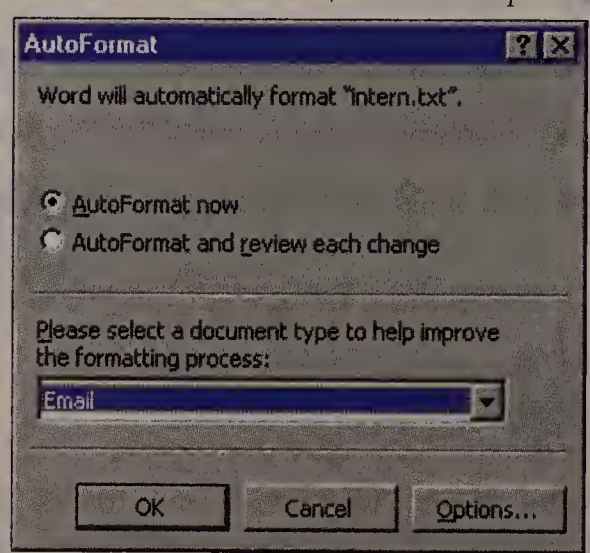


FIGURE 1: CONVERT PLAIN-TEXT FILES to Word format so that they're easier to edit.

TURN OFF WORD 97 FAST SAVES

WORD 97'S FAST SAVE option does indeed make file saving faster, but there are a couple of flies in the ointment. First, the document's size grows if you use this option, especially if it's heavily edited. Second, some alterations you make to imported graphics files—such as changes in brightness and contrast—are not saved if Fast Save is turned on, at least in the original release of Office 97.

To turn the Fast Save option off, select *Tools•Options*, click the *Save* tab in the Options dialog box, clear the *Allow fast saves* check box, then click *OK*.

Your file saving operations will be somewhat slower, but you'll save disk space and avoid some graphics headaches.

CREATING ATTRACTIVE FRACTIONS

MOST TEXT FONTS include characters for the common fractions 1/2 and 1/4, so that when you type 1-slash-2 or 1-slash-4, you get a fraction that looks typeset. But type 3-slash-16, and you get an unprofessional-looking typescript character.

The key to making uncommon fractions look typeset is to use superscript and subscript formatting for the numerator and denominator. **FIGURE 2** on the following page gives the keystrokes for Word, WordPerfect, and Word Pro.

Before you can create uncommon fractions in WordPerfect, add superscript and subscript buttons to WordPerfect's default toolbar. To do this, first right-click the desired toolbar and select *Edit* from the pop-up menu. In the Toolbar Editor dialog box, make sure the *Features* tab is selected, then choose *Format* from the 'Feature categories' drop-down list. Select *Attribute Superscript* from the Features ▶

ILLUSTRATION: JAMES YANG

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list, then click *Add Button*. Select *Attribute Subscript* from the Features list, and click *Add Button* again. Click *OK* to make the changes permanent.

In Word Pro press **<Alt>-<Enter>** to display the Text Properties InfoBox (if it's not already visible).

Give Uncommon Fractions a Typeset Look

Word (all versions)	WordPerfect (6.1 and later)	Word Pro (all versions)
1. Press <Ctrl>-<Shift>-+ (to turn on superscript).	1. Click the *Superscript* button.	1. In the Text Properties InfoBox, click *Superscript* in the Attributes list.
2. Type the numerator.	2. Type the numerator.	2. Type the numerator.
3. Press <Ctrl>-<Shift>-Z (to turn off superscript).	3. Click the *Superscript* button again.	3. Click *Superscript* again.
4. Type a slash.	4. Type a slash.	4. Type a slash.
5. Press <Ctrl>-= (to turn on subscript).	5. Click the *Subscript* button.	5. Back in the InfoBox, click *Subscript* in the Attributes list.
6. Type the denominator.	6. Type the denominator.	6. Type the denominator.
7. Press <Ctrl>-<Shift>-Z (to turn off subscript).	7. Click the *Subscript* button again.	7. Click *Subscript* again.
8. Change the font to its original size and resume typing.	8. Change the font to its original size and resume typing.	8. Resume typing.

FIGURE 2: SUPERSCRIPT AND SUBSCRIPT FORMATTING make complex fractions look attractive.

CHANGING BACKGROUND COLOR IN WORDPERFECT

I USED THE Windows 95 Display Properties dialog box to change the background color for all my programs to a light gray, rather than the normal bright white. I find it easier on my eyes. But WordPerfect refuses to cooperate, keeping the bright white background. How can I change this?

Ken Gregg, Odessa, Texas

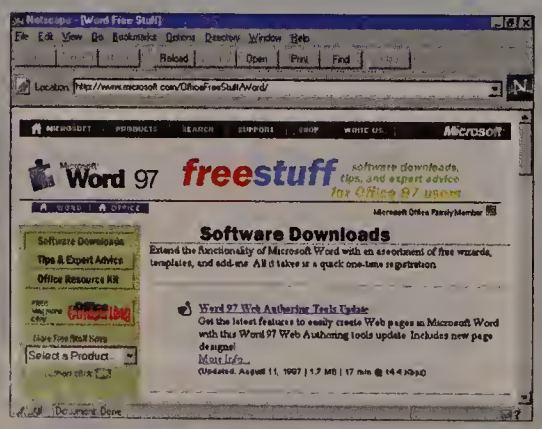
WHILE CHANGING window color in the Display Properties dialog box works for most applications, WordPerfect wants to do things *its* way. There is a fix for this, though, in all versions of WordPerfect from 6.1 on. Here's how:

1. Select *Tools•Settings* (WordPerfect 8) or *Edit•Preferences* (versions 6.1 and 7).
2. Double-click the *Display* icon.
3. In the Display Settings or Display Preferences dialog box, mark the *Windows System Colors* check box, then click OK.

This forces WordPerfect to use the color you selected in the Windows Control Panel as your background color. Your pages will print normally.

Download Free Word 97 Templates and Wizards

WORD 97 ARRIVES with a bushel basket full of useful templates and wizards to help you get your work done. Microsoft is always working on new templates and wizards, though, and makes them available on its Web site, free of charge. You'll also find program updates, new and improved file converters, and other Word add-ons at the same place. To see what's available, visit www.microsoft.com/OfficeFreeStuff/Word and download the files you want.



LINK TO WEB PAGES IN WORD PRO 97

INSERTING WEB LINKS in Word Pro 97 adds another dimension to your documents. When the reader double-clicks on the link, Word Pro starts the default Internet connection and Web browser and opens the HTML document in a new Word Pro window. Here's how to set up a link:

1. Select *Create•Click Here Block*.
2. In the Click Here Block Properties dialog box (see **FIGURE 3**), click the *Behavior* drop-down list and select *Follow a Link*. Type the text for your link in the 'Prompt text' box, then click the *Options* button.
3. In the Click Here Block Options dialog box, choose *URL* from the 'Script properties' list, then click *OK*.
4. Back in the Click Here Block Properties dialog box, click the *Link* button.
5. In the Click Here Link dialog box, type the complete URL for the Web page in the 'Link's destination path or URL' box. Type the wording you want to appear in your document in the 'Link's description text' box, and click *OK*.
6. Click *OK* in the Click Here Block Properties dialog box to complete the job.

Word Processing welcomes your questions and tips and pays $50 for published items. Contributing Editor George Campbell is a contributor to The PC Bible *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

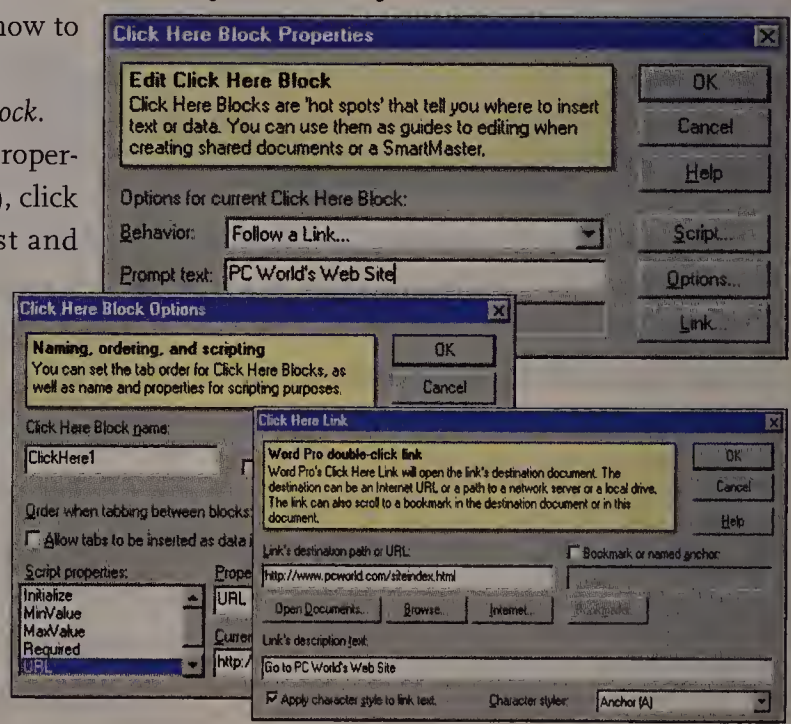


FIGURE 3: LINK YOUR WORD PRO 97 documents to the Web by using the program's Click Here Block feature.

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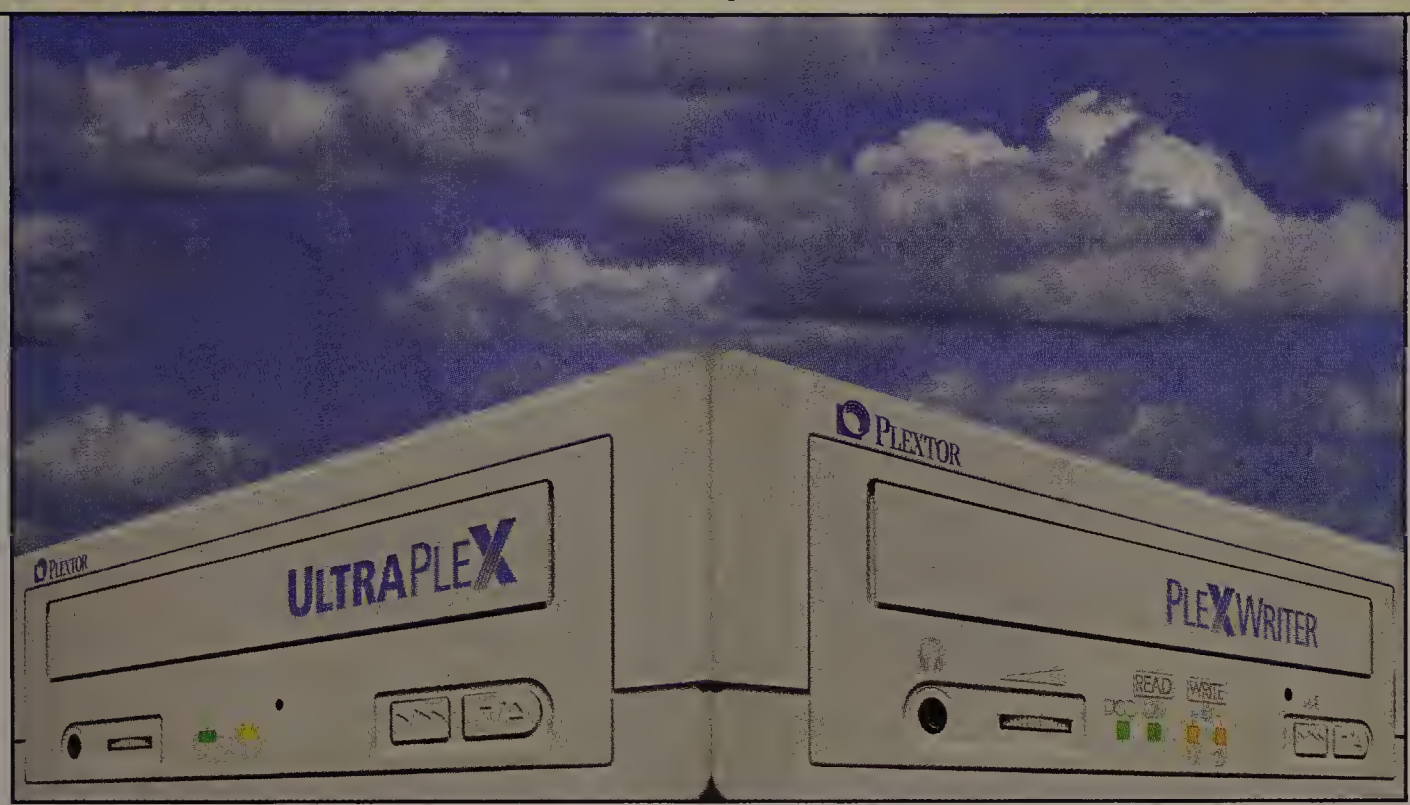

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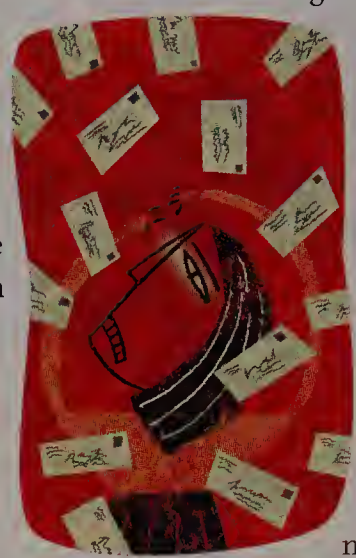
Get around Juno's limitations ◆ Don't get hung up on downloads

Survive the Savage Spam

EVER FEEL LIKE shooting off an angry note to a spammer?

One morning, Roberta (not her real name) decided she had suffered enough from unsolicited e-mail. She owns a wholesale distribution business with retail stores and a Web site, and she was particularly tired of receiving spams from a seller of golf balls. She wrote a curt note asking to be removed from the mailing list, saying, "I don't play golf, but if I did I wouldn't buy balls from a spammer."



A few hours later, Roberta found 1490 messages waiting for her on her company's mail server. Most were bounced copies of the original spam sales pitch. Some were angry messages from others complaining about the spam. (Some spams are set up so that if you reply to them, they're rebroadcast to thousands more e-mail boxes or Internet mailing lists from your address.)

"Reading the message headers, I realized that this jerk was using my company's domain name, adding random numbers to the beginning of the address, so his spams looked like they were coming from us," she says. "Since America Online and CompuServe apparently have blocks on the words 'golf balls' to filter his spams, all their bounces were coming to my company's domain name." Within a few hours, more than 10,000 messages flooded the server.

Angrily, she headed out on the Web and quickly found the spammer's real name, street address, and phone number. (There are a number of antispammer Web sites that list this information for notoriously obnoxious spammers. One place to start is the Blacklist of Internet Advertisers, at www.cco.caltech.edu/~cbrown/BL.) She called and left a message on his answering machine demanding that he remove her company's domain name from his spams. The bounced and angry messages trickled off over the next 24 hours.

What the spammer did is a felony. Redirecting e-mail messages to a victim's mailbox or server qualifies as telephone harassment, so Roberta might have been wise to contact the FBI.

For quicker action, contact your ISP immediately, explain the situation, and ask the provider to configure a filter to delete the spams.

And never dash off a heated response or write to the "postmaster" at the domain name listed in the message's Reply field. Your note may ricochet to an innocent victim—who'll complain to *you*.

SAVE ENTIRE WEB PAGES

IF YOU'RE RUNNING Netscape Communicator or Professional, you can save an entire Web page to disk, including its graphics, by selecting *File•Edit Page*. In the Netscape Composer dialog box, select *File•Save*. The page's HTML code and graphics will be saved in the directory you specify. You can later view the page offline with either Communicator or Composer. To save pages in previous incarnations of Netscape (or in Microsoft's Internet Explorer), you need an additional utility like WebWhacker, available on PC World Online at www.fileworld.com.

YOU KNOW JUNO, BUT DID YOU KNOW THIS?

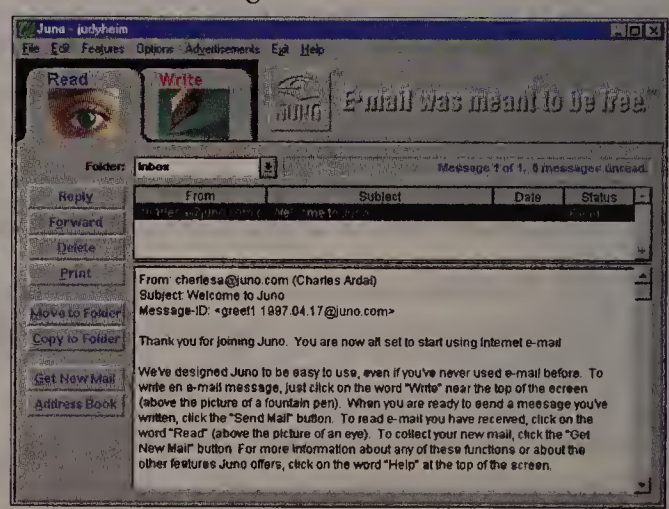
THERE IS NO CHEAPER or simpler way to tap into the Net than Juno, the Web's premier free e-mail service. You download a simple mail program from Juno's Web site (www.juno.com) or get it from a friend. It will work on just about any PC all the way back to grandma's 386 with 4MB of RAM and a VGA monitor. You don't even need a fast modem; a 9600-bits-per-second model will do. The software dials a local number (there are about 500 around the country) to send and fetch mail. It's mindlessly simple (see the figure). The only price you pay is having to look at ads on the screen when you log off.

If you believe Juno's figures, the service has acquired more than 3.5 million subscribers in its first two years. Juno president Charles Ardai claims that 43 percent of subscribers access the Internet in ways other than Juno, but prefer the simplicity of Juno e-mail—and of course its nonexistent price tag.

There are limits to how much mail you can send and receive. Juno won't confirm what those limits are, but it appears you can log on 12 times a day, send 20 messages each time, and receive about 1MB of mail. Messages can be only 64KB in length, and you can't send or receive messages with file attachments. Juno has no plans to change those restrictions.

Will Juno offer Web browsing? While ads for a Juno Web service have recently appeared in national magazines, Ardai claims the company is only "test marketing to gauge consumer response." The basic free Juno service will remain unchanged for the foreseeable future, but Juno may launch some related services.

An excellent mailing list exists to discuss Juno and all the ways you can access the Internet with it. To sign up, send a note to majordomo@world.std.com. The body of your message should contain only the following line:



JUNO'S FREE E-MAIL software lets you add signatures and set up folders to store incoming and outgoing mail.

ILLUSTRATION: JAMES YANG

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KM-711L	17" / 15.8"	1280 x 1024	OSD	.28mm
Performance Series				
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KM-711S	17" / 15.8"	1600 x 1280	OSD	.26mm
* KM-761	17" / 16.1"	1600 x 1280	OSD	.25mm
KM-810	19" / 18.0"	1600 x 1280	OSD	.26mm
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You'll find a Web page for the list at www.junoaccmail.org. If Juno is your only means of accessing the Net, you can obtain the page's contents by sending a message to agora@dna.affrc.go.jp. In the body of the message, type the following:

send http://www.junoaccmail.org

For directions on using Juno mail to search the Net and obtain software and the contents of Web pages, get a copy of Bob Appleton's Email4U by sending a message to pfinlaw@usa.net. In the subject line, type the following:

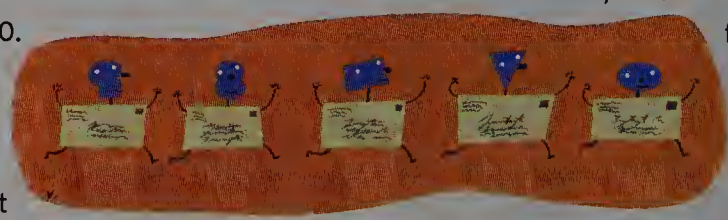
send email4u

A good book on downloading software and searching the Internet with Juno e-mail is *Juno: More than Free E-Mail* by Bob Rankin ($12.95, No Starch Press, 1997, 800/420-7240). You can find more tips and directions on cruising the Net via e-mail by visiting www.biz.mhv.net/drbob.

Five Tips for Using Juno E-Mail

1. To avoid disconnects and 'network error' messages, exit from any other Internet mail programs or Web browsers so that they won't interfere with Juno.

2. When installing a new version of Juno's software, first make a copy of the old address book. Head to the Juno folder and look for the subfolder user0000. In it, look for the addrbook.nv file. Copy the file to a different folder. After you install the new version of Juno, you can replace its address book file with addrbook.nv. Or, since addrbook.nv is a text file, you can open it in a word processor and cut and paste its contents into the new address book file.



3. To keep backups of messages and resend them, select *Options•Automatically save all sent mail.* If you need to resend a message, head to the Sent folder and click on the message. Click *Move to Folder* and then type **Outbox** when prompted. Messages are stored in the file fold0001.frm, which can be safely deleted when Juno is not running.

4. To retrieve deleted messages, select *Features•Export folder.* In the next dialog box, highlight *Deleted* and click *OK.* Save the deleted messages in a file named deleted.txt. Next, select *Features•Import folder* and select the file *deleted.txt.* Create a new folder for it, and click *OK.* You can now read the contents of the new folder by clicking the *Read* tab and selecting the folder from the Folder field.

5. To send file attachments, make them part of a message's text: Select *File•insert text file into message.* You can use this feature to send graphics or even software. First, though, you must encode it as a text file, and break it into segments of less than 60KB. You can do this with Snappy Software's freeware Wincode, available from PC World Online at www.fileworld.com.

SECRETS FOR FILE DOWNLOADS

HAVE YOU EVER run into a file that your browser just won't download? You click on the file, but instead of your browser saving it, a plug-in fires up, or an error message like 'Unable to launch external viewer' appears. This is particularly common with sound and movie clips. Here are tricks for handling it.

Netscape Communicator 4.0. If you can't download the file without running the plug-in, look for it in the cache:

1. Bypass the plug-in. Press the **<Shift>** key while clicking on the file link. Even if your browser is set up to run a plug-in when it encounters this type of file, it will download the file without loading the plug-in.

2. Instruct Communicator to download rather than play files. Select *Edit•Preferences.* In the Category box, under Navigator, click on *Applications.* In the box under Description, select the kind of file you wish to download, then click the *Edit* button.

The Edit button will be grayed out if a browser plug-in is installed that displays or plays that file type. For instance, if RealAudio is installed, that program will automatically play sound files that end in .wav or other common sound file extensions. To change these files' setups, you'll first need to uninstall the plug-in. You can find out which plug-ins are activated by heading to Communicator's Help menu and selecting *About Plug-ins.*

In the MIME Type line of the Edit Type dialog box, type **application/octet-stream.** Check the *Save to Disk* box. If you're asked to specify an application to handle the file, type **unknown.**

3. Head to Communicator's cache. If all else fails, you'll find in Communicator's cache subdirectory a copy of any file that the browser displayed or a plug-in has played. Look for it at C:\Program files\Netscape\Users*yourname*\Cache. It's going to have a funny name like MV2CC2g1.wav, but the file extension should give it away.

Internet Explorer 4.0. Instead of automatically running a plug-in when you click on a file of a certain type, IE gives you the option of saving it. It also stores the file in a temporary folder.

1. Instruct Explorer to save files to disk. Position the cursor over a file name on a Web page and left-click it. A dialog box will ask if you'd like to save the file to disk.

2. Look for the file in the Temporary Internet Files directory. When you click on a file link on a Web page, if Internet Explorer attempted to run the plug-in or display the file, chances are it saved a copy of it to C:\Windows\Temporary Internet Files. To check, select *View•Internet Options* and click the *General* tab. Under Temporary Internet Files, click the *Settings* button, then click the *View Files* button. Explorer will present a list of all the files in its Temporary Internet Files directory.

If you save files this way, be sure to give the browser enough time to copy the entire file to disk. Since you won't get any progress messages on the download, you'll need to watch your modem's flickering lights (when they stop flickering, the file has probably finished transferring), or any configured plug-in that may pop up.

Find files from this article on PC World Online at www.fileworld.com. Internet Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Judy Heim is a coauthor of* The Quilter's Computer Companion *(No Starch Press, 1997, 800/420-7240).* *See page 14 for contact information.* ■

ILLUSTRATION: JAMES YANG

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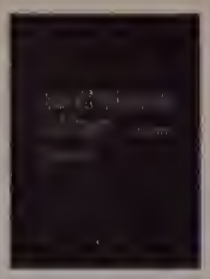

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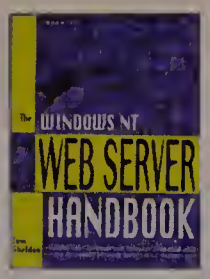

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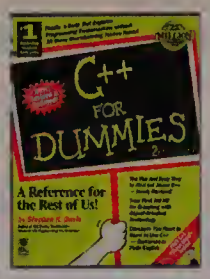

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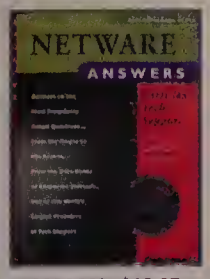

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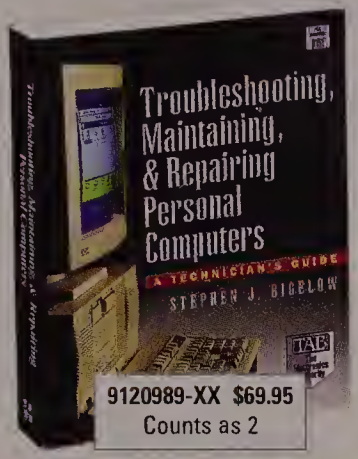

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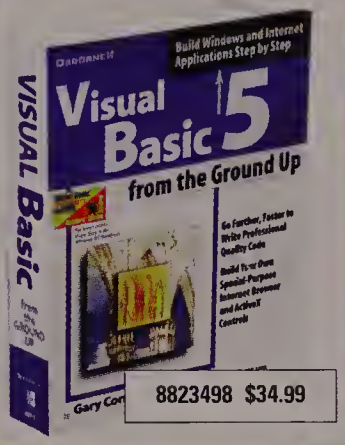

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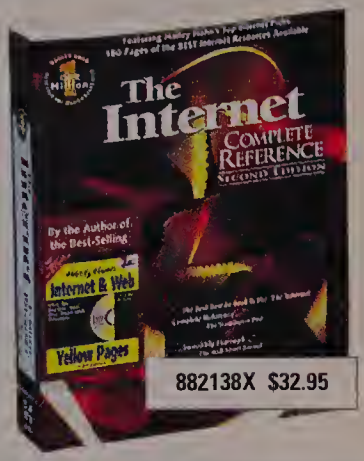

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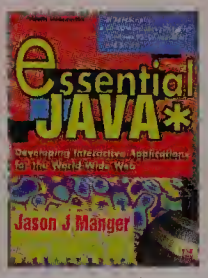

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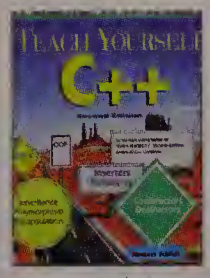

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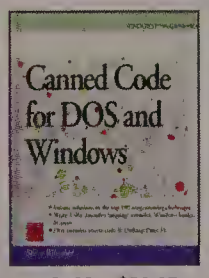

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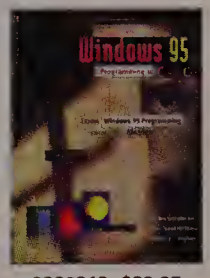

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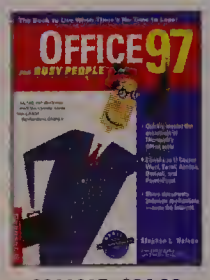

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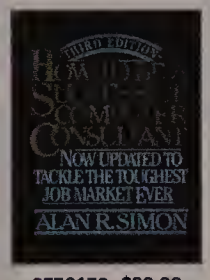

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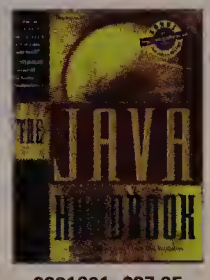

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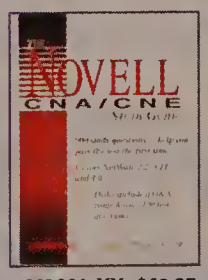

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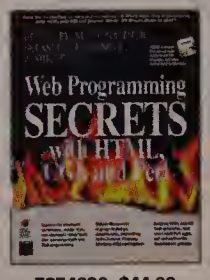

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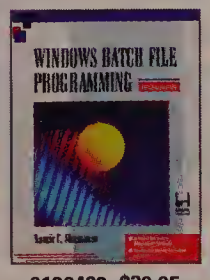

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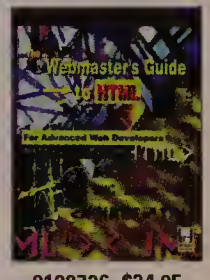

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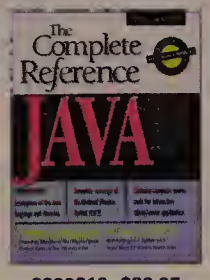

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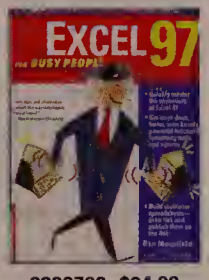

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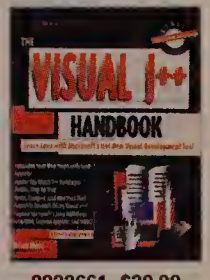

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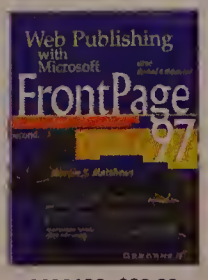

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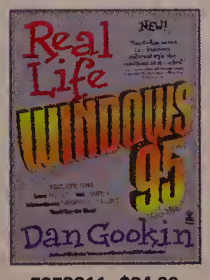

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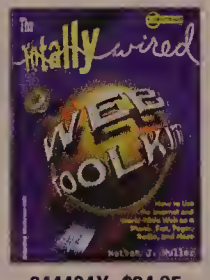

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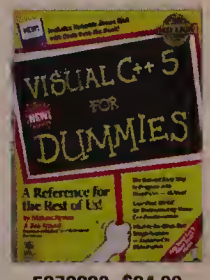

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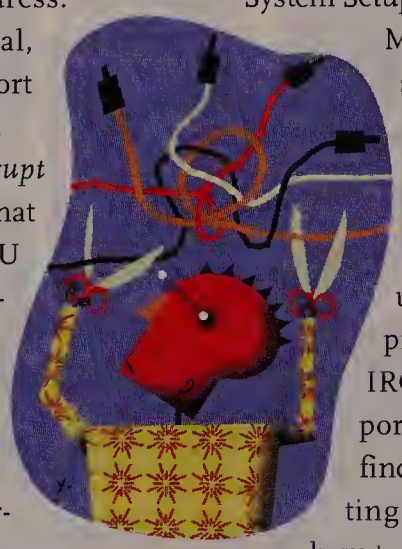
Clocking a '24X' CD-ROM drive ◆ Universal Serial Bus picks up speed

Troubleshooting PC Ports

WORKING WITH YOUR data gets easier all the time, but getting that data *into* the PC doesn't. Setting up an external modem or printer means cutting through that Gordian knot of cables at the back of your PC and properly configuring the serial and parallel ports. Even with Windows 95, that can be plenty troublesome. Here's what you need to know.

INTERRUPTS AND ADDRESSES

DATA MOVING between the CPU and any peripheral device is controlled by assigning an IRQ and an I/O address. For an external peripheral, these are assigned to the port that connects the peripheral.



IRQ stands for *interrupt request*, and that's exactly what it does. It interrupts the CPU and requests that the processor deal with the incoming data from a given device. PCs have 16 interrupts, numbered 0 to 15, and each serial and parallel port generally needs its own IRQ. (There are exceptions: Often COM1 and COM3 share an IRQ, and so do COM2 and COM4.)

Each port also needs a unique *input/output* address. Think of this as an in-box for the CPU, where incoming data is deposited before it's processed. If more than one device uses a specific IRQ or I/O address at the same time, neither device may work properly; or worse, your PC may lock up. So assigning IRQs and I/O addresses is serious business. Windows 95 was supposed to assign IRQs and I/O addresses automatically, but this is still an imperfect process, especially with serial ports.

If you're having trouble with a port, check your PC's IRQ and I/O address assignments. Select *Start•Settings•Control Panel*, click the *System* icon, and select the *Device Manager* tab. To check for resource conflicts, go down the tree and open *Ports (COM & LPT)*. If you see a small yellow circle with an exclamation point, you may have found the source of your problem.

Next, double-click the yellow circle, the *Properties* button, and finally the *Resources* tab. The Conflicting Device box should tell you which device and which resources are in conflict. An older, non–Plug and Play card may be listed as 'Unknown'.

To resolve the conflict, you must manually assign a new IRQ or I/O address to one of the offending devices. If the port is on the motherboard, try reassigning the port's IRQ or I/O address through the System Setup program (because Device Manager can't override the system settings for these).

To enter System Setup, press **<Delete>**, **<F1>**, or another key on start-up (check your system's documentation). Many setup programs let you choose IRQ and I/O settings for the port or disable it. If you can find an unused resource setting, you're set. If not, you'll have to change the resources used by the other device.

First, find an unused IRQ or I/O address. To do this, go to Device Manager and click *Computer* for a complete resource assignment listing. If you're short of unused IRQs, you can try to open one up by disabling an unused port via System Setup.

Then double-click the *Device Manager* listing for the conflicting device, go to its *Resources* tab, and uncheck the *Use automatic settings* box. Select the conflicting resource you want to change in the Resource Settings box and click the *Change Setting* button, and then enter the unused IRQ or I/O address in the *Value* box.

For more specifics on how to choose resources, see "Assigning Serial Ports" and "Assigning Parallel Ports."

OPTIMIZING SERIAL PORTS

PCS COME WITH one or two built-in serial ports. You'll usually find one 9-pin male connector on the back of your machine for each port.

As its name implies, a serial port moves data 1 bit at a time, so it's slower than a parallel port, which moves data 1 byte (or 8 bits) at a time.

The speed of your serial port depends on a UART chip, which breaks down the parallel data stream on your PC's bus into an outgoing, single-bit stream that moves through your serial cable. ▶

Assigning Serial Ports

EACH SERIAL PORT is identified by one of eight possible COM addresses—COM1, COM2, and so on—which corresponds to a unique I/O address and an IRQ.

If you install anything that needs an extra COM port, take care. COM1 and COM2 have standard addresses and IRQs that shouldn't be changed (and usually can be changed only in your PC's Setup program). If you need to assign COM1 or COM2 to a new device, go to the Setup program and either disable the serial port assigned to the needed COM or change its IRQ and I/O address to free those settings for the added device.

Note that all the standard COM addresses use only IRQ3 and IRQ4. It's never a good idea to have two devices using the same IRQ. If possible, try to assign new serial devices to COM3 through COM8, manually assigning IRQs and I/O addresses with Device Manager.

Standard Serial Port Resource Settings

COM	IRQ	I/O address
COM1	IRQ4	3F8
COM2	IRQ3	2F8
COM3	IRQ4	3E8
COM4	IRQ3[1]	2E8
COM5	IRQ4[1]	3E0
COM6	IRQ3[1]	2E0
COM7	IRQ4[1]	338
COM8	IRQ3[1]	238

[1] Can be set through Windows 95's Device Manager.

ILLUSTRATION: JAMES YANG

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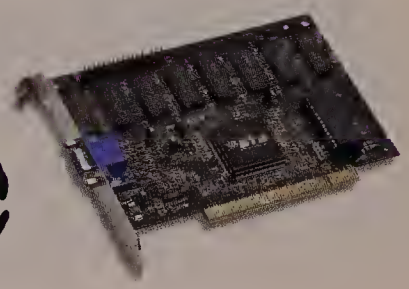

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Circle 210 on reader service card

Just about every PC now comes with a model 16550 UART. The 16550's maximum throughput of 115 kilobits per second provides plenty of bandwidth for most serial devices. But older UARTs like the 16450 and 8250 often don't.

Sometimes even a 16550 UART may not be fast enough; some analog modems can handle compressed data at rates of 230 kbps, and ISDN adapters can clock in at close to 1 megabit per second. So if you need more speed, buy a serial port expansion card with a 921-kbps 16750 UART.

WORKING WITH PARALLEL PORTS

PARALLEL PORTS ARE best known as connectors for printers, but they can also connect other devices such as scanners. They're faster than serial ports because they move data 8 bits at a time, at speeds ranging from 40 kilobytes per second to more than 1 megabyte per second.

Most PCs come with a single parallel port, a 25-hole female connector on the back. To add a second port, you buy an I/O card that goes into an expansion slot.

Parallel ports come in four types—unidirectional, bidirectional, EPP, and ECP—each offering different speeds and capabilities. Most newer PCs have parallel ports that support all four modes. To check which modes your parallel port supports, look in the peripherals section of the PC's Setup program.

Unidirectional. Sometimes called SPP, this is the most basic, and slowest, parallel port configuration. Data flows only one way—outward—to a printer or other device at around 40 KBps to 50 KBps.

Bidirectional. A bidirectional port's transfer rates range from around 100 KBps to 300 KBps. It also allows two-way communication between the attached device and the PC, so that the PC can receive status information from the device.

EPP. The Enhanced Parallel Port is designed for performance-hungry peripherals such as external drives and network adapters. Typically achieving transfer rates around 400 KBps to above 1 MBps, EPP provides the best performance your parallel port has to offer.

When you select *EPP* in System Setup, you may be given a choice between versions 1.7 and 1.9. For most peripherals bought in recent years, choose 1.9.

ECP. The Enhanced Capabilities Port is aimed at improving both speed and two-way communications between device and computer. If your printer or other peripheral supports ECP, then you may be able to get status reports and error messages from the device itself.

When you choose *ECP* in System Setup, a field will pop up for selecting a *direct memory access* channel. You assign DMA resources as you would IRQs, and you can avoid DMA conflicts by first looking in Device Manager for free DMA channels. If you can't fix the conflict, you can usually fall back to bidirectional mode.

You can put two peripherals on a single parallel port by using a pass-through connection, but be aware that this may cause problems in installation and operation.

A BETTER PORT FOR THE STORM

A REPLACEMENT FOR both parallel and serial ports is showing up in new systems and peripherals. It's called Universal Serial Bus. Capable of data rates as high as 12 megabits per second, USB can handle keyboards, monitors, mice, and many other devices—up to 127, to be exact. And it can handle all of them on a single port. Like their SCSI counterparts, USB devices can be strung together—daisy-chained—using only one precious IRQ. And you can buy a USB add-on card for older PCs.

Caution: The USB products we've tested often suffer from compatibility problems.

Hardware Tips *welcomes your questions and pays $50 for published items. Kirk Steers is a* PC World *contributing editor.* *See page 14 for contact information.* ■

A New Spin on CDs?

I'M LOOKING FOR a new CD-ROM drive and am a little confused by the speed ratings of the new models. It used to be that a 2X drive transferred data at 300 KBps, a 4X drive at 600 KBps, and so on. The drives I see now are rated at 20X or 24X "maximum." What is their actual speed, and why does it change?

Todd Whiteside
Lake Forest, Illinois

THE OLDER DRIVES spin with *constant linear velocity* to keep the data on the disc moving under the read head at a constant rate. To do this, the drive adjusts the disc's rotational speed whenever the head moves to a new track. The drive spins fastest when reading the innermost track. To keep the track's speed under the head constant, the drive spins more slowly as it reads the longer tracks further from the center. Thus the maximum transfer rate is set by the drive's rotational speed.

The newer CD-ROM drives, by contrast, spin with *constant angular velocity.* Because they don't vary their spin rate, they can spin faster than older models. Also, the constant spin rate means that data on an outer track moves under the head faster than data on an inner track. The maximum rate occurs when the head is reading the outermost track, the minimum rate when it's reading the innermost track. To get a single value, average maximum and minimum rates.

Assigning Parallel Ports

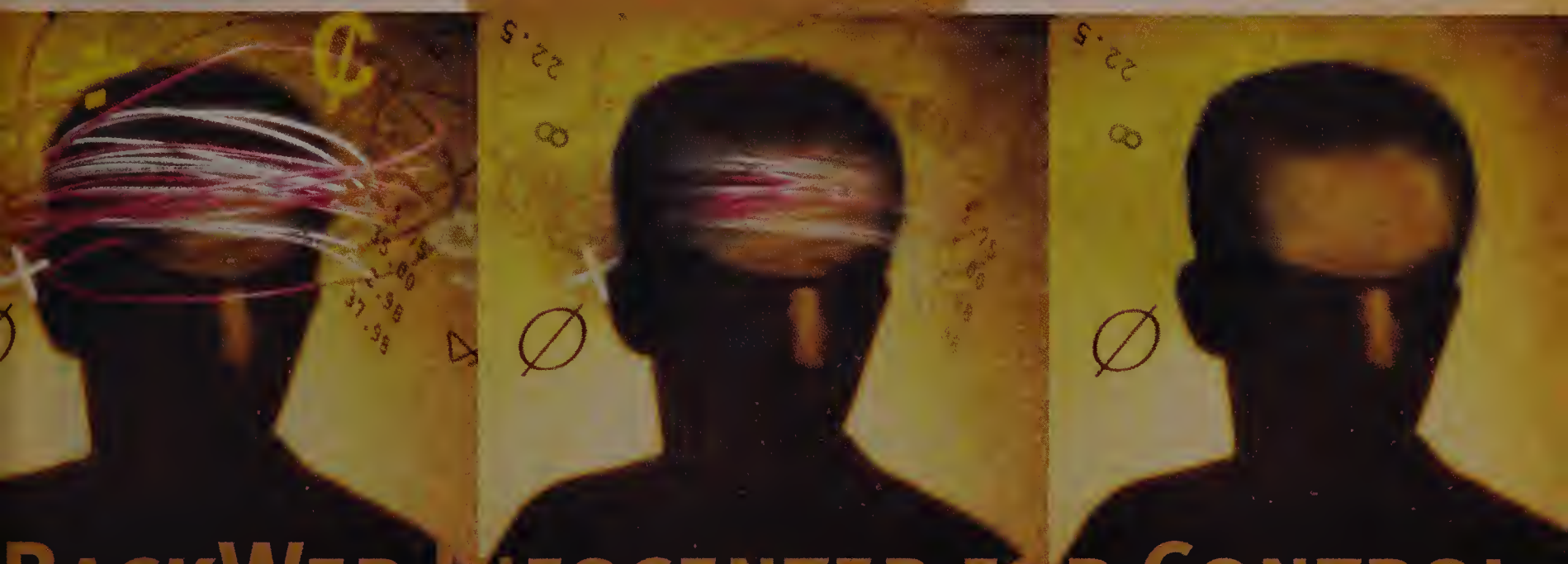
PARALLEL PORTS are designated as LPT. Your computer will automatically assign LPT1 through LPT3 to any parallel ports it detects.

If you install a second parallel port, make sure it uses a different IRQ. Some PCs may use IRQ7 as the default for both LPT1 and LPT2. Try setting LPT2 to IRQ5 in Device Manager. If it can't be changed there, try your system's Setup program.

Standard Parallel Port Resource Settings

LTP	IRQ	I/O address
LPT1	IRQ7	3BC
LPT2	IRQ7	378
LPT3	IRQ5	278

Because having too much information is just as bad as not having enough.



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Install a Faster Graphics Card

SURELY IT'S NOT the desire to play those fantastic new 3D games or run those full-motion videos plucked from the Web that makes the latest graphics cards so enticing. Surely it's the thought of grinding out those giant PowerPoint presentations more quickly. Greater productivity—you bet!

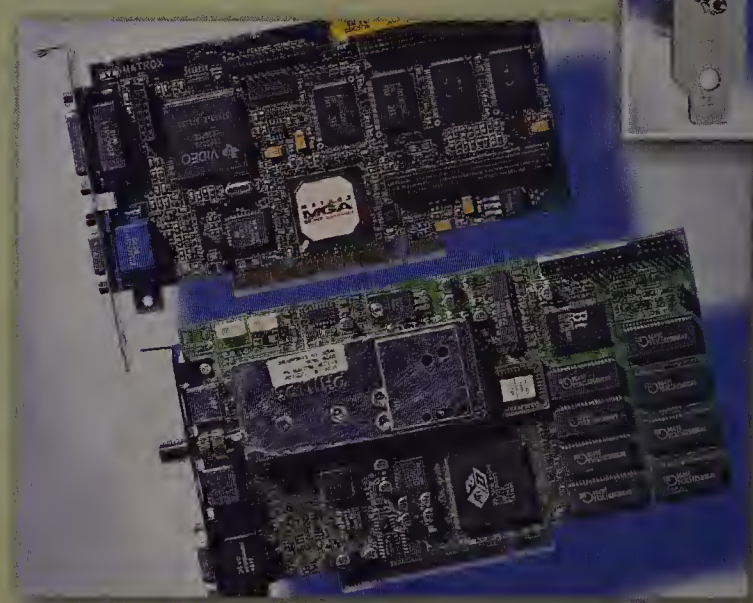
Whatever the applications you *really* want to run, a new graphics card can make a dramatic difference in your PC's performance, especially if your current system is more than a year old. The specialized graphics processors at the heart of today's graphics cards have become as sophisticated as the newest CPUs, delivering graphics performance that's orders of magnitude faster than prior generations'. Best of all, prices keep falling.

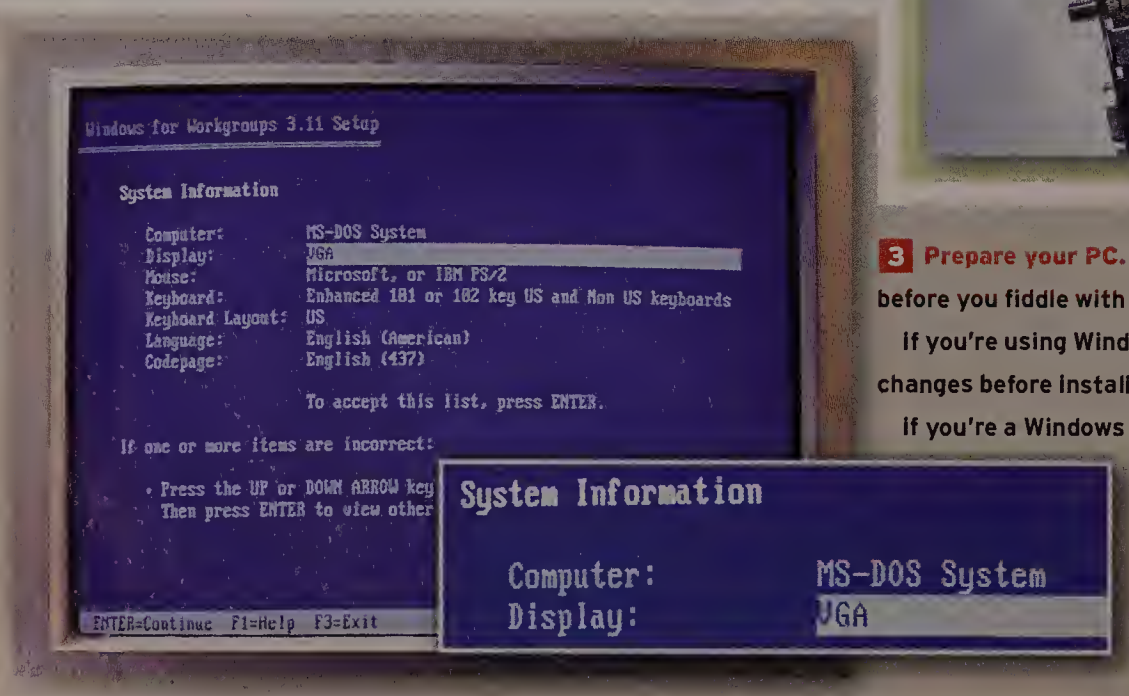
Except for the lowest-priced models, most of today's cards include 3D acceleration (for games and graphics applications) in addition to standard 2D graphics (for garden-variety PC applications such as word processors and spreadsheets). Most of today's cards are also optimized for video playback from both today's CD-ROMs and the upcoming generation of DVD-ROM drives. Some let you capture and edit video from your camcorder. And some even arrive with optional TV tuners.

1 Make sure you've got a PCI slot. Before purchasing your new graphics board, make sure that your computer can handle the latest cards. Most PCs made during the last three years have PCI slots, but examine yours. Check your manual, or open the PC case and find the existing graphics card (attached to the monitor). If necessary, remove the card and look at its slot.

2 Buy your new card. Figure on paying about $100 to $200. Name brands include ATI (www.atitech.ca), Diamond (www.diamondmm.com), Hercules (www.hercules.com), Matrox (www.matrox.com), STB (www.stb.com), and VideoLogic (www.videologic.com).

Shown below are a Matrox Millennium II (top) and an ATI All-in-Wonder with built-in TV tuner and video-capture features (bottom). The ATI board's ports are seen in close-up at right.





3 Prepare your PC. As always, back up the data on your hard disk before you fiddle with your PC's hardware.

If you're using Windows 95, you don't need to make any software changes before installing your new card.

If you're a Windows 3.*x* user, exit to DOS (don't just open a DOS box), run the setup program located in the \windows directory, and change the Display setting to VGA before installing your new card.

If you're a Windows NT user, software preparation is covered in step 5.

PHOTOGRAPHS: KEVIN CANDLAND

For recommendations, see our Top 10 Graphics Boards list. Whichever model you decide on, get at least 4MB of on-board memory. And don't be too concerned about all the acronyms for various types of memory (EDO DRAM, SGRAM, VRAM, MDRAM, WRAM). Each does a decent job. More memory delivers higher speeds, especially when you're working with high resolutions and dense colors. Also, don't be confused by claims of 64-bit versus 128-bit cards—they're mostly marketing hype. Check *PC World*'s benchmark results instead.

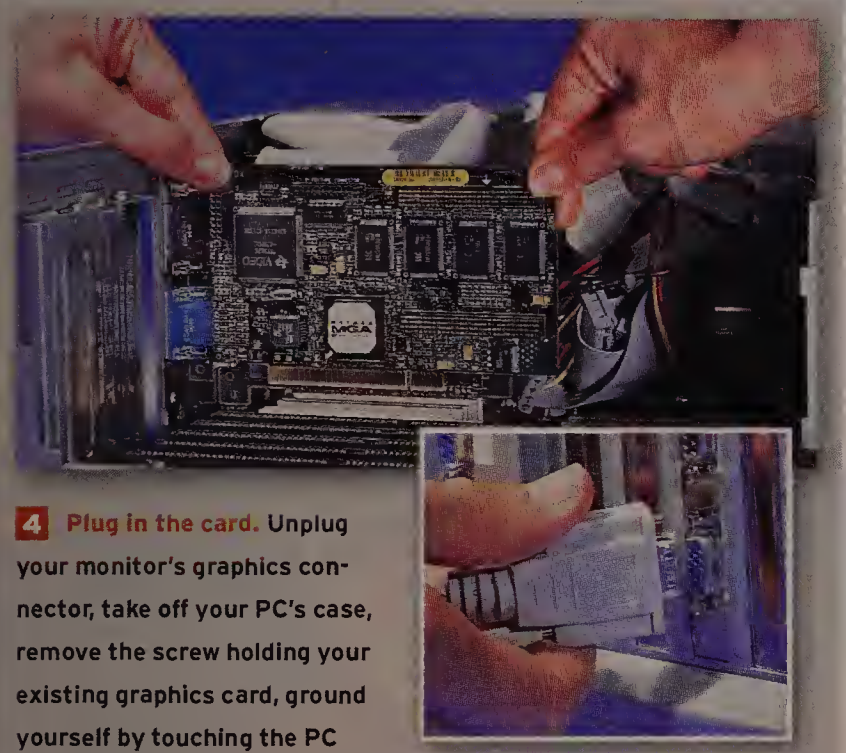
New graphics technologies generally haven't changed your upgrade options yet. MMX technology is built into the newest generation of CPUs—but not into the graphics cards. This technology improves graphics when used with applications written specifically for MMX-equipped PCs (mainly games and high-end professional graphics software). Then there's Accelerated Graphics Port, a new type of slot on new motherboards that requires special graphics cards. But you can't add AGP graphics cards to your existing PC.

Today almost all graphics cards are made for PCI slots. You can still find ISA boards, although they won't deliver much of a performance boost. VESA-bus boards are now hard to find.

One additional caveat: Your existing monitor may not be able to handle all that today's high-performance graphics cards can deliver. Even if it can, low refresh rates or high resolutions (1024 by 768, for example) on a 14- or 15-inch monitor can strain your eyes. You may want to consider buying a new, larger monitor, as well.

Installing a new graphics card is one of the easiest upgrades, but make sure you have your original Windows system CD-ROM handy, and keep the following basics in mind.

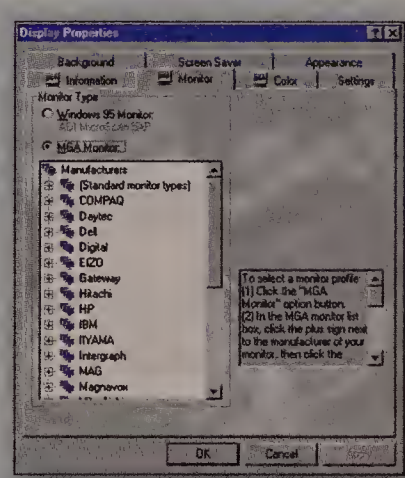
Stan Miastkowski is a PC World *contributing editor.* ■



4 Plug in the card. Unplug your monitor's graphics connector, take off your PC's case, remove the screw holding your existing graphics card, ground yourself by touching the PC case, and remove the old card.

Then carefully plug in your new graphics card and make sure that you firmly tighten the screw that holds it in place.

Connect the monitor to the new card, but don't put the case back on until you're sure that everything is working correctly.



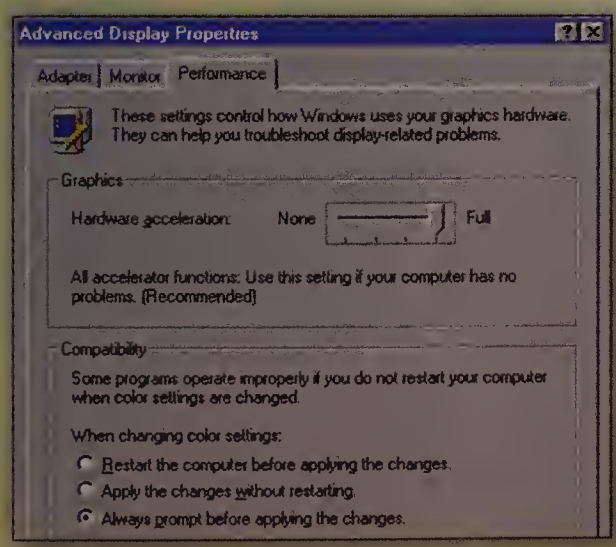
5 Install the software. Turn on your computer. If you're using Windows 95, it should then detect your new graphics card and start installing software for it. Depending on which version of Windows 95 you are using, you will then see either a menu of choices or a New Hardware Installation Wizard. Insert the Windows 95 driver disc or CD-ROM that came with your new graphics card, then choose the option for manufacturer-supplied driver and click Continue.

If you're a user of Windows 3.*x*, follow the directions for installing the drivers that came with the new graphics card.

On a Windows NT machine, choose *VGA Mode* from the Startup menu, then follow the card maker's directions.

Windows 95 should properly detect plug-and-play monitors (as with Matrox's setup software above). But you must specify your monitor during setup with both Windows 3.*x* and Windows NT.

The last phase of the software installation lets you set the screen resolution and other settings for your new card.



6 Test and tune your graphics board. Test your new card with your favorite applications before putting the cover back on your PC.

If you see strange behavior such as image tearing or color shifts, you may have to use the card's software to select a lower resolution, fewer colors, or a lower refresh rate.

If you are still suffering from problems, you can also try adjusting other settings. For example, if you've installed a Matrox Millennium card under Windows 95, go to *Start•Settings•Control Panel•Display*, click the *Settings* tab, choose the *Advanced Properties* button, and click the *Performance* tab (left). Experiment with changing the Hardware acceleration slider setting to see if it solves your display problems.

If it doesn't, try continuing to experiment with changing the settings that your graphic card's software offers.

Still have problems? It's time to contact your graphics card maker's tech support.

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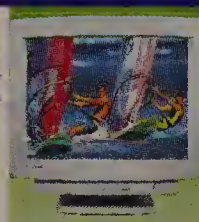

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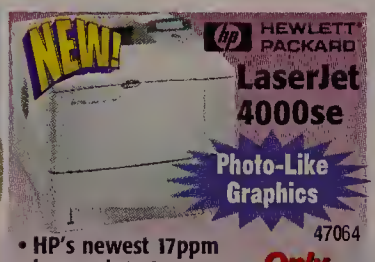

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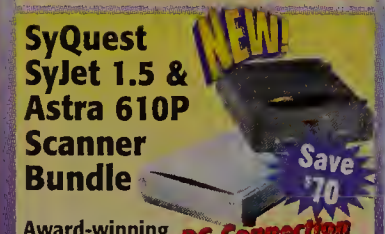

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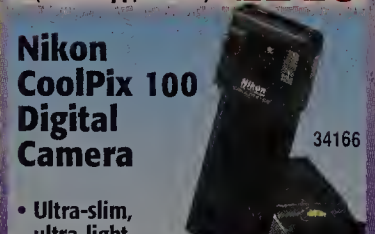

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Matrox Mystique	2Meg SGRAM	59
ATI 3D Pro Turbo	2Meg/4Meg	89, 179
ATI Xclaim 30	4Meg SGRAM	179
ATI 3D Xpression	2Meg SDRAM	79
Apple PowerMac 4400	2Meg/4Meg	89/139
NEC Powermate Pro 150, 220	2Meg,/6Meg WRAM	129, 259
HP Vectra XV/6, VT/6, VA, XA	2Meg/6Meg WRAM	129, 259
Compaq 1Meg Video 213922-001	1Meg	69
Compaq Deskpro 2000, 4000, 6000	2Meg/6Meg WRAM	129/299
144 pin SD Dimm (SGRAM)	2Meg/4Meg/8Meg	39,69,99
Apple PowerMac G3	2Meg/4Meg/8Meg	39,69,99

Many More Please Call

GATEWAY MEMORY

Dest. Big Screen D5 – SDRAM	8Meg/16Meg/32Meg/64Meg	39/69/119/289
Dest. Big Screen D6 – EDD (pairs)	4Meg/8Meg/16Meg/32Meg	17/32/49/94
Family PC w/MMX – SDRAM	8Meg/16Meg/32Meg/64Meg	39/69/119/289
G5-166, 200 Prof. System – SDRAM	8Meg/16Meg/32Meg/64Meg	39/69/119/289
G5-166M, 200M MMedia System – SDRAM	8Meg/16Meg/32Meg/64Meg	39/69/119/289
G6-200 Prof. System – SDRAM	16Meg/32Meg	69/119
G6-Prof. M MMedia System – EDD	4Meg/8Meg/16Meg/32Meg	17/32/49/94
Multimedia G-5 Systems – SDRAM	8Meg/16Meg/32Meg/64Meg	39/69/119/289
Prof, P-5 Series – SDRAM	8Meg/16Meg/32Meg/64Meg	39/69/119/289

We Carry All GATEWAY Memory

NEC MEMORY

Ready 5010, 7010, 7020, 9010, 9022 / Ready 9510, 9520, 9522, 9530, 9532 / Ready 7022 (EDD)

Image P60, P90, D, P100E

(Pairs) 4Meg/8Meg/16Meg/32Meg — 22/39/66/129 — *We Carry All NEC Memory*

HEWLETT PACKARD MEMORY

Netserver 4/66LC-5/133LC (pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Netserver LE 486SX33 – 486DX266	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Netserver LH Plus 5/133, 5/166 (EDD, ECC)	16Meg/32Meg/64Meg/128Meg	99/189/409/875
Netserver 4/33LM – 5/100LM (pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Netserver 5/75LS – 5/133 LS4 (pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Pavillion 5010-7170 (pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Vectra 500 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Vectra VA 6/180, 6/200 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Vectra VE2 5/75 – 5/133 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Vectra XA 6/180, 6/200 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Vectra XM4 Series	4Meg/8Meg/16Meg/32Meg	17/34/49/94

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IBM APTIVA, PC, P/S1 & P/S2

Aptiva 300, 500 Series	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Aptiva 700 Series (pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Aptiva A Series (pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Aptiva C Series (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
Aptiva M Series	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 330 Models 6571-6576	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 330 Model 6577 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 340 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 350 Model 6587 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/109
PC 730 Model 6877 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC 750 Models 6885-6886 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/109
PC 750 Model 6887 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/34/49/94
PC Server 310 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/109
PC Server 500 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249
P/S 1, 30 Pin Simms	1/Meg/4Meg	10/24
P/S 1, 72 Pin Simms	4Meg/8Meg/16Meg/32Meg	19/34/57/109
P/S 2, 55SX, 65SX	4Meg	39
P/S 2, 53, 53LS, 56, 57	4Meg/8Meg	29/59
P/S 2 Server, 95, 195, 295 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249

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IBM NOTEBOOK & LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY PRICE
Thinkpad 340, 345, 355, 380, C, CE	*4Meg/8Meg/16Meg/32Meg*	*49/69/99/199*	*129.00*
Thinkpad 365C, CS, CD, E, ED	*4Meg/16Meg*	*39/89*	*129.00*
Thinkpad 365X, 365XD	*8Meg/16Meg/32Meg*	*49/84/159*	*129.00*
Thinkpad 380, 3800, 3850	*4Meg/8Meg/16Meg/32Meg*	*49/69/99/199*	*129.00*
Thinkpad 500, *510CS*	4Meg/8Meg/16Meg	49/69/99	*189.00*
Thinkpad 560, 560E	8Meg/16Meg/32Meg/64Meg	49/84/159/339	
Thinkpad 700, 720, 750, CL57SX	*4Meg/8Meg/16Meg/32Meg*	*39/79/159/268*	*179.00*
Thinkpad 701, 701C, 701CS	*4Meg/8Meg/16Meg/32Meg*	*39/49/84/189*	*109.00*
Thinkpad 755C, CE, CD, CS	*4Meg/8Meg/16Meg/32Meg*	*49/69/99/199*	*159.00*
Thinkpad 760C, CD, L, LD	*8Meg/16Meg/32Meg*	*49/89/189*	*159.00*
Thinkpad 760E, ED, EL, ELD	*8Meg/16Meg/32Meg*	*49/84/159*	*159.00*
Thinkpad 760XD, 760XL	*8Meg/16Meg/32Meg/64Meg*	*49/84/159/339*	*159/269*
Thinkpad 765D, 765L	*8Meg/16Meg/32Meg64Meg*	*49/84/159/339*	*159/269*
Thinkpad 770 (SDRAM)	16Meg/32Meg/64Meg	149/319/649	

COMPAQ MEMORY MODULES

Deskpro 386, 486 M Series	2Meg/4Meg/8Meg	29/39/69
Deskpro M Series Expansion Board	0K (no memory)	119.00
Deskpro 450, 4100, 575, 590, 5100, 5133	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Deskpro 575, 5120, 5133, 5150, 5160 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Deskpro 2000, 4000, 6000 Series (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Deskpro 5/60M, 5/66M, XE560 (quads)	2Meg/4Meg/8Meg/16Meg/32Meg	19/28/54/69/139
Deskpro XL 6150, 6200 (ECC, pairs)	8Meg/16Meg/32Meg/64Meg, 128Meg	Call
Deskpro 2000, Presario 4112, 4122, 4712, 4716, 5526, 5528	1Meg Video	39
Presario 5536, 9232, 9234, 9240, 9250, 9260, 9642, 9660	1Meg Video	39
Presario 510, 520, 524, 660, 720, 724, 860	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Presario 920, 924, 954, 974, 978, 992	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Presario 833, 850, 860, 866	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Presario 5528, 7110, 7152	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Presario 7170, 7180, 9536, 9546, 9548, 9564 (pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Proliant 1000 5/60, 2000, R, 4000, R (quads)	4Meg/8Meg/16Meg/32Meg	19/28/54/69
Proliant 1500, 1500R (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Proliant 4500, 4500R (quads)	4Meg/8Meg/16Meg/32Meg/64Meg	39/64/119/239/599
Proliant 5000, 5000R (pairs)	32Meg/64Meg/128Meg/256Meg	Call
Prolinea 4/25S, 4/33, 4/66	2Meg/4Meg/8Meg	29/39/69
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Prolinea 5100, 5120, 5133, 5150, 5166 (EDO pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Prolinea 575E, 100E, 120E, 575MX (pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Prolinea 590MX, 5120MX (pairs)	4Meg/8Meg/16Meg/32Meg	22/39/59/119
Prolinea 6150E, 6180E (pairs)	8Meg/16Meg/32Meg	39/59/119
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	28/54/69/139
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	28/54/69/139

COMPAQ NOTEBOOK/LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY PRICE
Armada 1100, 1120T, 1120, 1125	*8Meg/16Meg/32Meg/64Meg*	*49/89/169/349*	*119.00*
Armada 1130, 1130T (pairs)	*4Meg/8Meg/16Meg*	*44/60/99*	*119.00*
Armada 1510DM, 1520DM, 1550DMT	16Meg/32Meg/64Meg	89/169/349	
Armada 4100, 4110, D, 4120, T, 4130T (pairs)	4Meg/8Meg/16Meg	39/59/119	
Armada 7710MT, 7730MT, 7750DMT	16Meg/32Meg/64Meg	89/169/349	
Concerto 4/25, 433	*4Meg/8Meg/16Meg*	*44/69/99*	*139.00*
Contura 4/25, 4/25C, 4/25CX	*4Meg/8Meg/16Meg*	*44/69/99*	*109.00*
Contura 400C, 400CX, 410C, 410CX	*4Meg/8Meg/16Meg*	*44/89/99*	*109.00*
Contura 420C, 420CX, 430C, 430CX	*4Meg/8Meg/16Meg/24Meg*	*44/69/99/189*	*109.00*
Contura Aero	*4Meg/8Meg/16Meg*	*39/69/99*	*109.00*
LTE 5000, 5100, 5200, 5300	*8Meg/16Meg/32Meg/64Meg Kit*	*29/69/169/359*	*139.00*
LTE Elite 440C, CX, 4/75CX	*4Meg/8Meg/16Meg/24Meg*	*39/69/109/189*	*139.00*
LTE Lite 425	*4Meg/8Meg/16Meg*	*49/79/136*	*195.00*
Prasario 1000, 1010, 1020, 1030, 1070, 1080	*8Meg/16Meg/32Meg*	*49/89/169*	*119.00*
Presario 1207, 1210, 1610	16Meg/32Meg/64Meg	89/189/369	

DELL MEMORY

Dimension XPS M166S, M2090, P133s, 166s, 200s, P133v, 166v, 200v	8Meg/16Meg/32Meg	39/69/119
Dimension XPS P60, P75, P90, P100 (pairs)	4Meg/8Meg/16Meg/32Meg	17/32/49/94
Dimension XPS P100c, 120c, 133c, 166c, XPS P75T, 100T (pairs) FPM or EDD	4Meg/8Meg/16Meg/32Meg	20/38/59/119
Dimension XPS Pro 150, Pro 200 (quads)	4Meg/8Meg/16Meg/32Meg	28/48/69/129
Dimension XPS Pro 150n, 180n, 200n (Edo pairs)	4Meg/8Meg/16Meg/32Meg	17/32/49/94
Optiplex GL, GM, GMT (Edo pairs)	4Meg/8Meg/16Meg/32Meg	17/32/49/94
Optiplex GS, GXL, GXM, GXMT (Edo pairs)	4Meg/8Meg/16Meg/32Meg	17/32/49/94
Optiplex GXI, GXpro, 6180, 6200 (Edo, Ecc)	16Meg/32Meg/64Meg/128Meg	99/179/399/799
PowerEdge 2100, 4100 (Edo, Ecc)	16Meg/32Meg/64Meg/128Meg/256Meg	99/179/399/799/1799

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	0K Bd	256k	1	2	3	3.5	4	5	6	8	16	32
Brother 630, 631, 641, 645	–	–	39	59	–	–	–	–	–	–	–	–
Canon LBP 430	–	–	19	–	–	–	49	–	–	–	–	–
Canon LBP 860, 1260	–	–	–	19	–	–	49	–	–	59	79	139
Epson Action Laser 1100, 1600	–	–	19	29	–	–	49	–	–	69	89	–
Epson Action Laser II	–	–	74	–	123	–	–	180	–	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	–	74	–	123	–	–	180	–	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	–	49	–	–	98	–	–	–	–	–
HP 2, 2D–	–	–	–	59	–	–	79	–	–	–	–	–
HP 3, 3D, 3P, 2P+	–	–	–	*59*	–	–	*89*	–	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	–	19	–	–	39	–	–	69	–	–
HP 4L	–	–	29	–	–	–	–	–	–	–	–	–
HP 4MP, 4P	–	–	9	19	–	–	34	–	–	59	–	–
HP 4+, 4M+, 4V, 4MV	–	–	9	19	–	–	34	–	–	59	79	139
HP 5, 5M, 5MP, 5N, 5P, 5SI, 5MX	–	–	9	19	–	–	34	–	–	59	79	139
HP 5L, 6L	–	–	–	–	–	–	49	–	–	99	–	–
HP 6MP, 6P	–	–	9	19	–	–	34	–	–	59	79	139
HP Design Jet 200, 220	–	–	–	–	–	–	39	–	–	69	–	–
HP Design Jet 230, 250C	–	–	–	–	–	–	39	–	–	69	89	149
HP Design Jet 330, 350C	–	–	–	–	–	–	39	–	–	69	89	149
HP Design Jet 600, 650C	–	–	–	–	–	–	39	–	–	69	–	–
HP Design Jet 650C PS	–	–	–	–	–	–	39	–	–	69	89	149
HP Design Jet 700, 750C, Plus, 755	–	–	–	–	–	–	39	–	–	69	89	149
HP Deskjet 500, 500C, 510, 550,560	–	29	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/PS, 1600C,1600CM	–	–	–	–	–	–	39	–	–	69	–	–
IBM Laser 4019, 4019E	–	–	–	–	–	109	–	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	–	49	–	–	–	–	–
IBM Laser 4039, 4079	–	–	–	*39*	–	–	*69*	–	–	*99*	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	–	39	–	–	59	89	149
Lexmark Valuwriter 300,600	–	–	29	39	–	–	69	–	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	–	29	39	–	–	69	–	–	–	–	–
Lexmark S Series	–	–	–	–	–	–	–	–	–	–	–	149
NEC 90, 290	–	–	–	89	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	59	–	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	–	67	89	169	–	189	–	–	–	–	–
Oki 810E, EX, 600E, EX, 610E, EX	–	–	29	79	–	–	119	–	–	149	229	–
Panasonic 4420/4450I	–	–	–	79	–	–	109	–	–	–	–	–
Panasonic 4410/4430	–	–	–	*59*	–	–	*99*	–	–	–	–	–
Panasonic 4450	–	–	89	–	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	–	49	69	–	–	109	–	–	–	–	–
Panasonic 4440, 5410	–	–	69	–	–	–	109	–	–	–	–	–
Panasonic 6500	–	–	14	14	–	–	49	–	–	–	–	–
Sharp 9400, 9460, 9600, 9700E	–	–	49	69	–	–	119	–	–	–	–	–
Sharp 9500, E, H, 9700, H	–	–	49	–	–	–	236	–	–	–	–	–

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Compaq Aero, 400, 410, 420, 430	109
Compaq LTe 5000 Series	139
Epson Action Note 650, 660	119
Epson Action Note 800, 866, 880, 910	119
IBM Thinkpad 355, 360	119
IBM Thinkpad 365 C, ED, XD	129
IBM Thinkpad 701	109
IBM Thinkpad 750, 755	179
IBM Thinkpad 755 CD, CE, CV, CX	179
NEC Versa 2400, 2405, 2430, 2435	159
NEC Versa E, V	$135
NEC Versa S	99
Sharp 3010, 3020, 3050, 3060, 3150	129
Sharp 8700, 8800, 8900	129
TI 4000E	100
Toshiba 400, 405, 410, 415, 420, 425, 430 (NIMH)	219
Toshiba 100, 105, 110, 115, 200, 205	105
Toshiba 2100 Series	99
Toshiba 2400, 2450, 1900, 1950, 1960	109
Toshiba 4700, 4800, 4850, 4900	109
Toshiba T4500, T4600	159
Winbook XPC, XP, XP5	119

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY PRICE
Libretto 50CT	8Meg/16Meg	69/118	
Tecra 500CDT, CS, 510CDS, CDT	*8Meg/16Meg/32Meg/48Meg/128Meg*	*49/69/169/289/689*	*259.00*
Tecra 520CDT, 530CDT	*8Meg/16Meg/32Meg/48Meg/128Meg*	*49/89/169/289/689*	*259.00*
Tecra 700CS, 700CT (SDRAM)	*8Meg/16Meg/32Meg*	*69/109/209*	*279.00*
Tecra 710CDT, 720CDT, 730CDT	*8Meg/16Meg/32Meg/64Meg/128Meg*	*49/89/169/359/689*	*279.00*
Tecra 730XCDT, 740CDT	*8Meg/16Meg/32Meg/64Meg/128Meg*	*49/69/169/359/669*	*279.00*
T2000SXE	*8Meg*	*94*	*170.00*
T2100 Series	*4Meg/8Meg/16Meg/24 Meg*	*29/49/99/159*	*119.00*
T1900, T4500, T4600, T4700, T4900 All Models	*4Meg/8Meg/16Meg/32Meg*	*39/64/109/189*	*109.00*
T2400, T3400, T3400CT, T3600	*8Meg/16Meg*	*49/89*	*119.00*
Satellite T100CS, 105CS, 110CS, 110CT, 115CS	*8Meg/16Meg/32Meg*	*59/99/189*	*119.00*
Satellite 200CDS, 205CDS Series	*8Meg/16Meg/32Meg*	*69/99/189*	*119.00*
Satellite 220CDS	8Meg/16Meg/32Meg/48Meg/128Meg	49/89/169/289/689	
Satellite T400 Series, T600 Series	*8Meg/16Meg/32Meg*	*69/99/189*	*229.00*
Satellite Pro 440, 460	8Meg/16Meg/32Meg/48Meg/128Meg	49/89/169/289/689	
Portege 300	16Meg/32Meg	99/199	
Portege 650CT, 660CT	*8Meg/16Meg/32Meg/64Meg*	*49/89/169/359*	*265.00*

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY PRICE
ACERNote 730C, 735C, 760C, 760CX, 780CX	*4Meg/8Meg*	*49/69*	*129.00*
ACERNote 763, 765, 782, 784, 786	4Meg/8Meg/16Meg	29/59/89	
ACERNote Light 350, 352, 355	*4Meg/8Meg/16Meg*	*29/69/89*	*179.00*
ACERNote Light 356, 358, 359, 361 (pairs) edo	*4Meg/8Meg/16Meg*	*39/59/99*	*179.00*
ACERNote Nuovo 971, 972, 372, 373, 374	8Meg/16Meg/32Meg	49/99/179	
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4Meg/8Meg/16Meg	39/59/99	
Ambra SN Series	*4Meg/16Meg*	*49/119*	*120.00*
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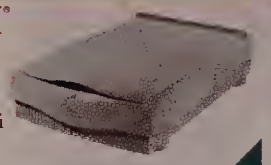

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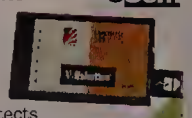

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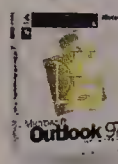

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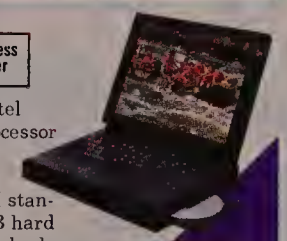

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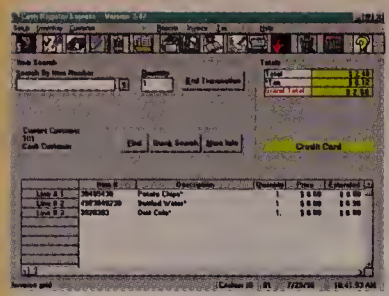

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Microsolutions 8X Parallel Port 209
Panasonic KXL-783A PCMCIA Kit w/sound 369
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CD-R - Plextor Plexwriter 2x4 int/ext 466/579
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IOMega Zip / JAZ 1.0G int 139/279
Pinnacle Micro Apex Optical 4.6G 1239
Syquest EZ-Flyer 230 Par/ Syjet 1.5G int. 189/359
Seagate 4mm DAT 8.0G int./ext. 849/949
Seagate Tapestor 3.2G ext. par/4G ext.SCSI. 189/439
Sony Stor Station 2.0G w/Navigator Software 129
Sony Nice 5200 int./ext. 689/799

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Quantum Fireball 2.1G FATA/TM 3200 3.2G 169/219
Maxtor EIDE 3.2GB 199
Seagate Medallist 3.2GB SCSI-2 209
Western Digital Caviar AC22100 2.5G/5.0G .185/299

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U.S. ROBOTICS

Megahertz XJ4336 33.6 V.34 (cellular capable) 223
Megahertz XJ4288 xJack 28.8 PC Card V.34 229
Courier V.Everything 56K int. ....PRICE DROP!!
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Sportster PCMCIA 2.1 28.8 w/fax V.34 (w/20Rebate) .169
Sportster Voice x2 56K int./ext 169*/189*
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FX-C5	17"	1280x1024	28mm		739
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TX-C7	17"	1600x1200	25mm		869
FX-E7	21"	1280x1024	28mm		1669
FX-E8	21"	1600x1200	26mm		2269

HITACHI

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Elite 630	17"	1600x1280	22mm		569
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CM5600	20"	1600x1280	28mm		989

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CPD-1005F	15"	1280x1024	25mm (digital)		365
CPD-100VS	15"	1280x1024	25mm w/speakers		459
CPD-200SX	17"	1280x1024	25mm		575
CPD-200SF	17"	1280x1024	25mm (digital)		635
CPD-220VS	17"	1280x1024	25mm w/speakers		739
GDM-17SE2T	17"	1600x1200	25mm		819
CPD300SFT	20"	1280x1024	30mm		1349
CPD-20SF2	20"	1600x1200	30mm		1569
GDM-20SE2T	20"	1600x1200	25mm		1789

VIEWSONIC

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V773 OPTI	17"	1280x1024	26mm		489
O100 OPTI	21"	1600x1280	28mm		989
15G5	15"	1280x1024	28mm		299
17PS	17"	1600x1280	25mm		642
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MT-9017E	17"	1600x1280	25mm		621
MT-9021E	21"	1600x1280	30mm		1399
MT-9221	21"	1800x1440	28mm		1529

MULTIMEDIA

Altec Lansing ACS500 5-Channel Dolby Speakers ..249
Creative Labs Awe 64 Gold 4M 179
Creative Labs Discovery 12X Kit w/SB 32 283
Creative Sound Blaster 16 Value IDE Card 89
Labtec 3210 20-watt Speakers (call for other models) ..82

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3COM 3C905TX PCI / 5-pack 89/419
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SMC EtherEZ PCMCIA 129
Xircom NextGeneration E-net 10/100 Ready 139
Xircom 10BT/S6K Combo 299
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Smart-UPS 450/700/1400/2200 ....275/338/594/1029
Back-UPS Office 250 119

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ALPS

MD2010	600dpi	color	inkjet		236
MD2300	600dpi	color	inkjet		619
MD4000	600dpi	color	w/scanner		419

CALCOMP

TechJet 720C ....D-size / E-size 1989/2379

ENCAD

Croma 24 ....24" 600x300dpi ....color 1759

EPSON

Stylus 400/600	4ppm	720/1440	color		193/255
Stylus 800	8ppm	1440x720	color		362
Stylus 1520	6ppm	1440x720	color, 17x22"		739
Stylus 3000	7ppm	720x720	color 13x19"		1699

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Deskjet 1600C / 1600CN / 1600CM					1299/1649/1899
DeskJet 1000CXI	600dpi	color	letter,11x17		469
LaserJet 6LXI	6ppm	600dpi	1MB		379
LaserJet 6PXI	8ppm	600dpi	2MB		729
LaserJet 6MP	8ppm	600dpi	3MB	postscript	879
LaserJet 4V	16ppm	600dpi	4M8	11x17	1753
LaserJet 4MV	16ppm	600dpi	12M8	11x17,PS	2539
LaserJet 5SI	24ppm	600dpi	4MB	network	2349
LaserJet 5SINX	24ppm	600dpi	4MB	ethernet	2649
LaserJet 5SIMX	24ppm	600dpi	12MB	e-net PS	3399
LJ 5 Color	10ppm	300dpi	20MB	color	3799
LJ 5M Color	10ppm	300dpi	36MB	color, PS	4849
LJ 5SIMopler	24ppm	600dpi	12MB	duplex	6699
LaserJet 4000	17ppm	1200dpi	4MB	postscript	1099
LaserJet 4000T	17ppm	1200dpi	4MB	3-tray	1259
LaserJet 4000N	17ppm	1200dpi	8MB	ethernet	1411
LaserJet 4000TN	17ppm	1200dpi	8MB	3tray/enet	1549

LEXMARK

Jetprinter 1000 / 2030 / 2055					139/179/199
Jetprinter 3000 / 2070 / 7000 / 7200					239/289/349/399
Optra E+	6ppm	600dpi	2MB		372
Optra LXN+	16ppm	1200dpi	8MB		1939
Optra N240	24ppm	600dpi	4MB	11x17	2645
Optra N245	24ppm	600dpi	16MB	11x17	3139
Optra S1250	12ppm	1200dpi	4M8		999
Optra S1650	16ppm	1200dpi	4MB		1239
Optra S1250N	12ppm	1200dpi	4MB		1299
Optra S1650N	16ppm	1200dpi	4MB		1529
Optra S2450	24ppm	1200dpi	4MB		2149
Optra S2450N	24ppm	1200dpi	12MB		2499
Optra SC1275	12ppm	600dpi	16M8	Color	3791
Optra SC1275N	12ppm	600dpi	32MB	Color	4199

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Pacemark 3410 Dot Matrix (multi-part forms)					1369
OkiPage 4W	4ppm	600dpi			192
OkiPage 6E	6ppm	600dpi			287
OkiPage 6EX	6ppm	600dpi	2M8		419
OL810E	8ppm	600dpi	2MB		575

QMS

Magicolor CX ....12ppm ..600dpi ....20MB ..Color 4999

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ScanJet Office 300dpi Printing, Clr Scanning 589

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Astra 600S 300dpi 30-bit w/Photodeluxe 159
Astra 1200S 600x1200dpi w/Photodeluxe 229
Astra 1200S 600x1200dpi w/Photoshop Full 399
PowerLook II PS w/Photoshop Full 1289

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AITech Pro PCTV+ / Wavewatcher TV-2 ....139/268
ATI 3D Graphics XPression + PC2TV 2MB 119
ATI All-In-Wonder (TV Tuner, Video Capture, TV set display) .175
Diamond Stealth 3D 2200XL / Monster 3D ...79/179
Intel SmartVideo III 171
Matrox Millennium II PCI 4M/8M 175/259
Matrox Mystique PCI 2M / 4M 96/119
Sigma Reel Magic Ultra MPEG 294

*- After $50 Mail-In Rebate from USR, exp. 1/17/98.

* * * * COMPUTERS * * * *

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Presario 2200	MGX-180	16M	1.6G	8X	33.6K		819
Presario 4505	P166MMX	16M	2.1G	16X	33.6K		1019
Presario 4508	P200MMX	24M	3.2G	16X	33.6K		1199
Presario 4528	P233MMX	32M	3.2G	24X	33.6K		1499
Presario 4840	Pent II-266	32M	6.5G	DVD	56K		2099
Presario 4850	Pent II-300	32M	6.5G	DVD	56K		2379

SONY

Valo PCV-120	P200MMX	32M	3.8G	16X	33.6		CALL
Valo PCV-130	P200MMX	32M	4.3G	24X	56K	Zip	1525
Valo PCV-200	Pent II-233	32M	4.3G	24X	56K	Zip	2036
Valo PCV-220	Pent II-266	32M	6.4G	24X	56K	Zip	2229
Valo PCV-240	Pent II-300	32M	6.4G	24X	56K	Zip	2799

WORKSTATION PC'S

COMPAQ

Deskpro 2000	P166MMX	16M	2.1G		3 HD Bays		999
Deskpro 2000	P166MMX	32M	3.2G	16X	3 HD Bays		1029
Deskpro 2000	Pent II-233	32M	3.2G	24X	Matrox 4MB		1989
Deskpro 2000	Pent II-266	32M	3.2G	24X	Matrox 4MB		2199
Deskpro 2000	Pent II-300	32M	3.2G	24X	Matrox 4MB		2549
Deskpro 4000N*	P166MMX	32M	1.6G		10/100TX		1129
Deskpro 4000N*	P233MMX	32M	2.1G		10/100TX		1479
Deskpro 4000S**	P166MMX	16M	2.1G		10/100TX		1089
Deskpro 4000S**	P233MMX	32M	2.1G		10/100TX		1499
Deskpro 4000	P166MMX	16M	2.4G		10/100TX		1279
Deskpro 4000	P166MMX	32M	3.2G	16X	10/100TX		1649
Deskpro 4000	P233MMX	32M	3.2G	16X	10/100TX		1919
Deskpro 4000	Pent II-233	32M	3.2G	24X	10/100TX		2099
Deskpro 4000	Pent II-300	32M	3.2G	24X	10/100TX		2649
Deskpro 6000	Pent II-233	32M	2.1G	24X	Ultra SCSI		2399
Deskpro 6000	Pent II-266	32M	4.3G	24X	Ultra SCSI		2899
Deskpro 6000	Pent II-300	64M	4.3G	24X	Ultra SCSI		3539

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Equium 6230D	Pent II-233	32M	3.0G	24X	108T / audio		2169
Equium 6260M	Pent II-266	32M	4.0G	16X	10BT / audio		2569

SERVERS

COMPAQ

Prosignia 200	Pent II-233	32M	no HD	16X	Netelligent		2199
Proliant 800	Pent Pro 200	32M	no-HD	8X	Auto Recovery		2329
Proliant 850R	Pent Pro 200	32M	no-HD	8X	Web 5erver		3329
Proliant 2500	Pent Pro 200	32M	no-HD	8X	5 Plug. Bays		4199
Proliant 5500	Pent Pro 200	128M	no-HD	8X	Netelligent		11099
Proliant 6500	Pent Pro 200	128M	no-HD	16X	exp. 4 Proces.		14869
Proliant 7000	Pent Pro 200	128M	no-HD	16X	18 HD Bays		16999

HEWLETT PACKARD

Netserver E40	Pent Pro 200	32M	no-HD	8X	4 HD Bays		1869
Netserver E45	Pent II-233	32M	no-HD	24X	4 HD Bays		2179
Netserver LD	Pent Pro 200	32M	no-HD	4X	UW-SCSI		3099
Netserver LH	Pent Pro 200	64M	no-HD	12X	exp. 2 P-Pro		5579
Netserver LXE	Pent Pro 200	64M	no-HD	4X	6 Hotswap Bays		9190
Netserver LXR	Pent Pro 200	128M	no-HD	4X	exp. P-Pro		13999
Netserver LX	P Pro 200dual	128M	no-HD	4X	exp. 4 Proces.		16189

IBM

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COMPAQ

Presario 1610	P150MMX	12.1"D	16M	1.6G	14X				2159

CTX

EZ350S	P150	12.1"D	16M	1.4G	16X				1579
EZ350F	P150	12.1"T	16M	1.4G	16X				1969
EZ364D-K	P166MMX	12.1"D	40M	2.0G	16X				2219
EZ354T-K	P150MMX	12.1"Tx	40M	2.0G	16X				2534
EZ364T-K	P166MMX	12.1"Tx	40M	2.0G	16X				2559

FUJITSU

Lifebook 435DX	P133MMX	12.1"D	16M	1.6G	20X	56K			1879
Lifebook 535TX	P133MMX	12.1"T	16M	2.0G	20X	33.6			2234
Lifebook 765TX	P166MMX	12.1"T	32M	3.2G	20X	56K			3599
Lifebook 585TX	P233MMX	12.1"Tx	32M	4.0G	20X	33.6			3489

HEWLETT PACKARD

Omnibook 2000CS	P133	12.1"D	16M	1.4G					1819
Omnibook 2000CT	P133	12.1"T	16M	1.4G					2399
Omnibook 5700CT	P150MMX	12.1"T	16M	2.0G					2629
Omnibook 5700CTX	P166MMX	12.1"Tx	16M	2.0G					2929

HITACHI

Visionbook Plus	P150MMX	12.1"D	16M	1.4G	10X	33.6			2149
Visionbook Plus	P166MMX	12.1"T	16M	2.1G	10X	33.6			2579
Visionbook Elite	P166MMX	13.3"Tx	16M	2.1G	10X	56K			3999
Visionbook Pro	P166MMX	13.3"Tx	32M	3.0G	10X	56K			4199
Visionbook Pro	P233MMX	13.3"Tx	32M	3.2G	20X	56K			5189

IBM

Thinkpad 380E	P150MMX	12.1"D	16M	2.1G					1929
Thinkpad 380ED	P166MMX	12.1"D	16M	2.1G	20X				2399
Thinkpad 560E	P166MMX	12.1"T	16M	2.1G					3699
Thinkpad 760XD	P166MMX	12.1"Tx	32M	3.0G	8X	28.8			4339
Thinkpad 765D	P166MMX	13.3"Tx	32M	3.0G	8X	33.6			4799
Thinkpad 770	P233MMX	14.1"Tx	32M	5.4G	DVD	33.6			6941

SHARP

PC9320T	P150MMX	11.3"T	32M	1.6G	10X	33.6			2399
PC9800T	P166MMX	12.1"T	32M	2.0G	10X	33.6			3199
PC9820T	P233MMX	13.3"Tx	32M	3.0G	14X	56K			3940
PC-9340	P166MMX	12.1"T	32M	2.1G	14X	56K			2929
PCM-100	P200MMX	12.1"T	32M	2.1G	14X	56K			3529

SONY

Vaio PCG-707C	P166MMX	12.1"Tx	32M	2.1G	14.5X	33.6			3599
Valo PCG-717C	P200MMX	12.1"T	32M	2.1G	14.5X	33.6			3329
Vaio PCG-719C	P266MMX	12.1"Tx	32M	2.1G	14.5X	33.6			4059

TROGON

OUALITAS	P166MMX	13.3"Tx	16M	2.1G	20X	33.6			2999
SUPERUS	P166MMX	14.2"Tx	32M	2.1G	20X	33.6			3619
SUPERUS	P166MMX	14.2"Tx	32M	3.0G	20X	33.6			3799
SUPERUS	P200MMX	14.2"Tx	32M	3.0G	20X	33.6			3979

TOSHIBA

Libretto 50CT	P75	6.1"T	16M	810M					1449
Satellite Pro 440CDX	P133MMX	12.1"D	16M	1.4G	10X	33.6			1899
Satellite Pro 440CDT	P133MMX	12.1"Tx	16M	1.4G	10X	33.6			2525
Satellite Pro 460CDT	P166MMX	12.1"Tx	32M	2.1G	10X	33.6			3149
Satellite Pro 460CDX	P166MMX	12.1"D	32M	2.1G	10X	33.6			2399
Satellite Pro 480CDT	P233MMX	12.1"T	32M	3.8G	10X	33.6			3829
Portege 300CT	P133MMX	10.4"T	32M8	1.6G		33.6			2851
Portege 650CT	P133	11.3"T	16M	1.2G					2099
Portege 660CDT	P150	11.3"T	16M	1.3G	10X				2588
Tecra 520CDT	P166MMX	12.1"T	32M	2.1G	10X	33.6			3470
Tecra 530CDT	P166MMX	12.1"Tx	32M	2.1G	10X	33.6			3899
Tecra 730XCDT	P150MMX	12.1"Tx	16M	2.0G	10X	28.8			2956
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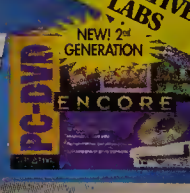

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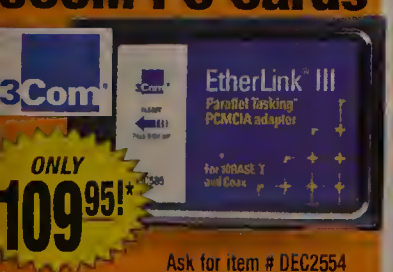

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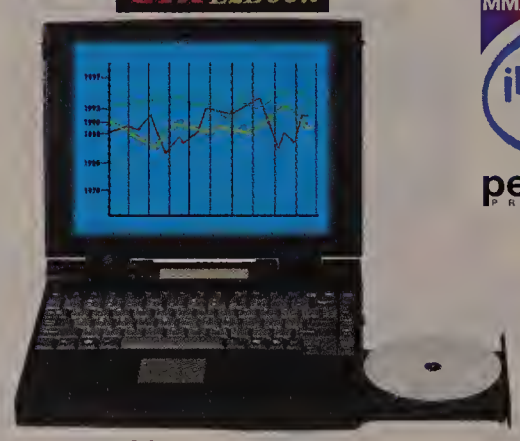

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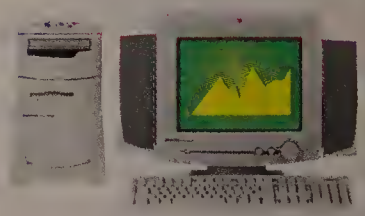

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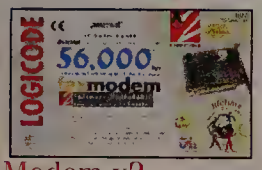

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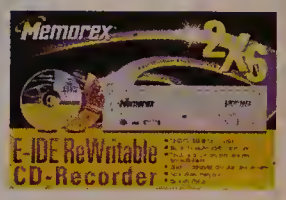

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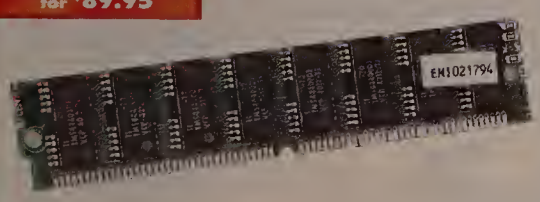

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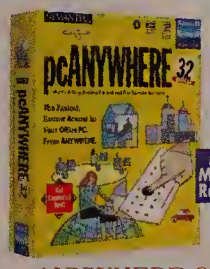

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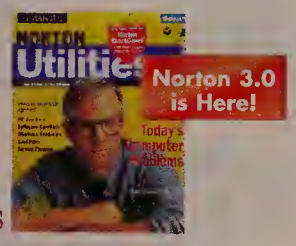

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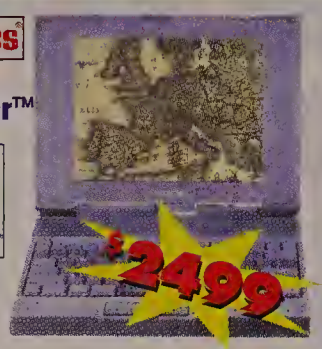

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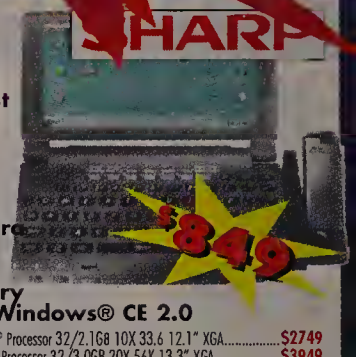

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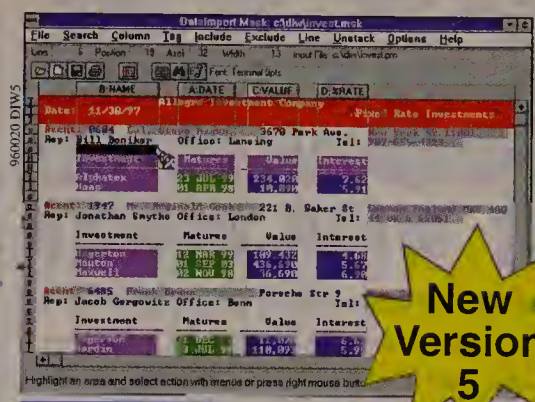

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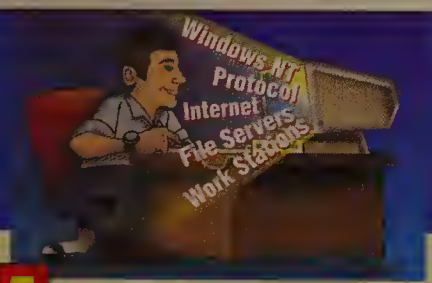

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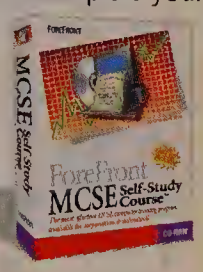

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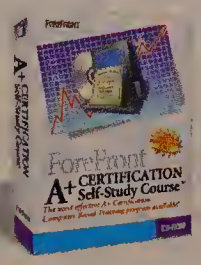

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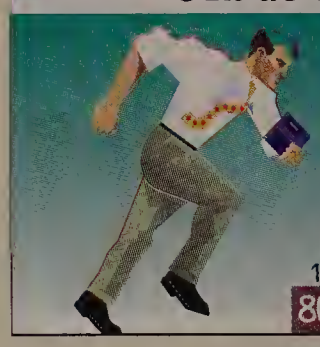

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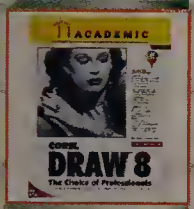

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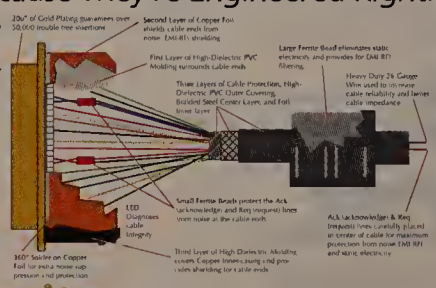

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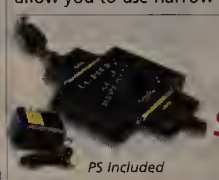
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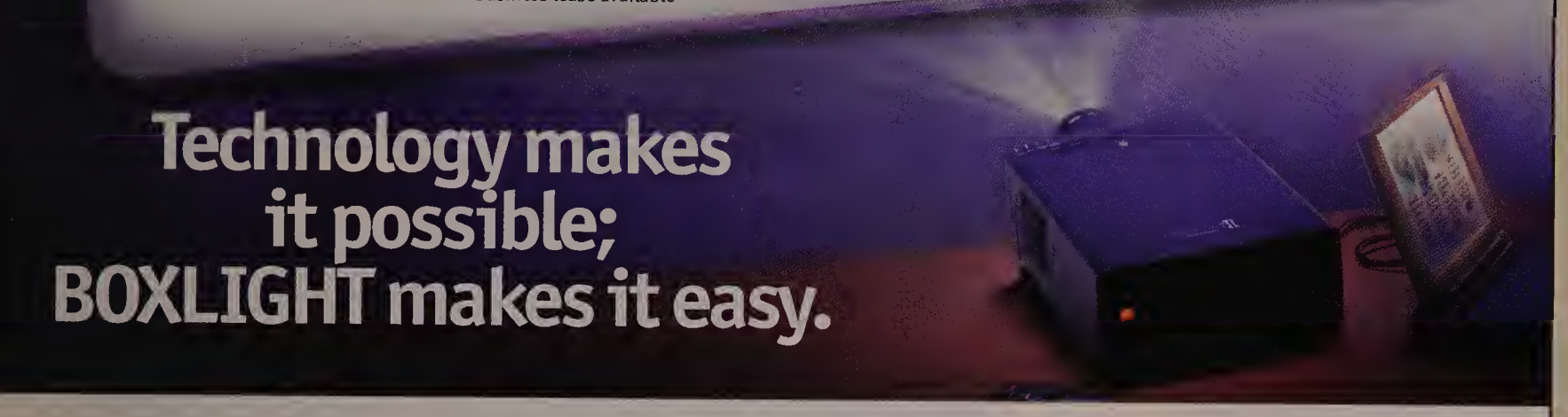

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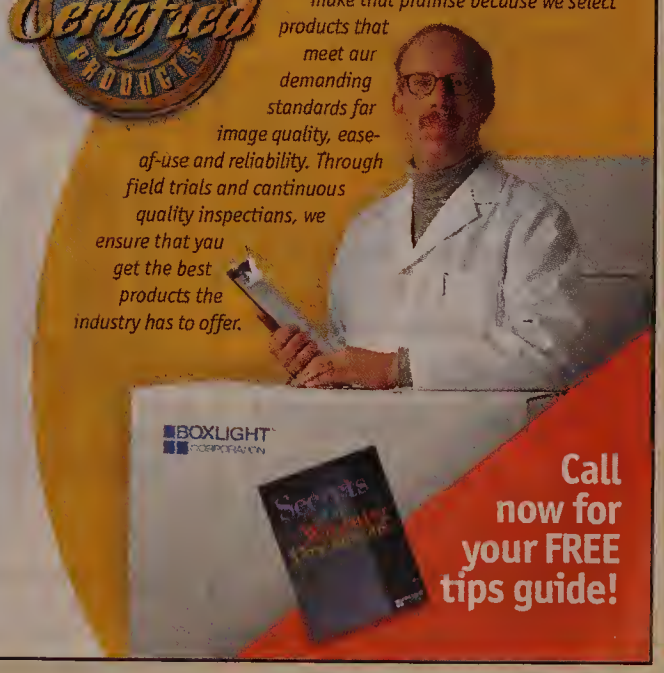

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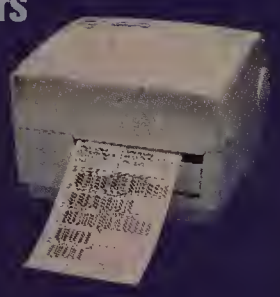

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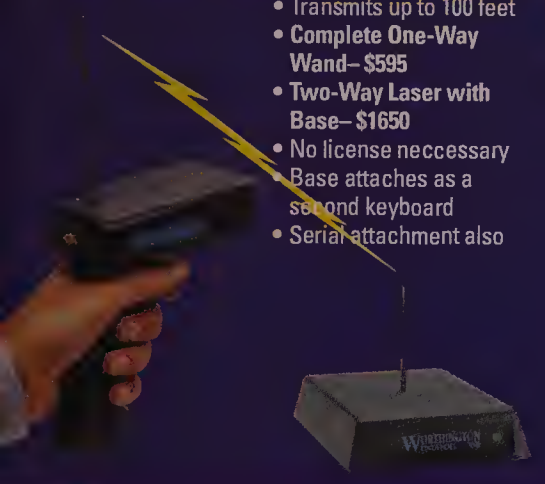

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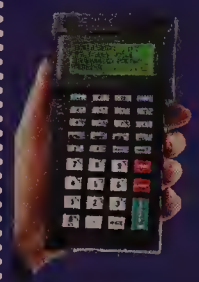

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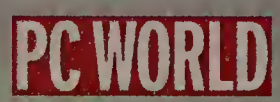

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AGENDA

9:00-12:20 MORNING SESSION

- **Welcome and Introduction** *Vicki J. Brown, Senior Vice President*
- **Mapping the Route to Opportunity** *Frank Gens, Senior Vice President, Internet Research*
- **The Wintel Empire at the Crossroads** *Dave Vellante, Senior Vice President, Systems, Software and Storage Research*
- **Telecom Goliaths: Roadblock or Fast Track?** *Gigi Wang, Senior Vice President, Communications Research*
- **The Wired Market: Redefining Business and Industry** *John Gantz, Senior Vice President, Personal Systems, Collaborative Computing, and Services Research*

Session A 1:30 - 2:10	Session B 2:20 - 3:00	Session C 3:10 - 3:50
TRACK 1: Internet		
Internet Commerce — Where's the Money? Caroline Robertson	The Firewall is Burning! Gaining Market Share from the Intranet and Extranet Build-Out Michael Sullivan-Trainor	In Search of the Jetsons: Stalking the Wired Consumer David Card
TRACK 2: Personal Systems		
The PC Market of Tomorrow Bruce Stephen	PC Technology Roadmap Sean Kaldor	Changing the PC Channels Tony Amico
TRACK 3: Systems		
NT's Attack on the Enterprise Dan Kusnetzky	Clustering the Enterprise — Unix and NT take on legacy systems... David Floyer	PC Servers: Are They Ready for Primetime? Susan Frankle
TRACK 4: Software		
The New Millennium Software Industry Tony Picardi	Supply Chain Automation: Change and Opportunity in the Global Applications Market Clare Gillan	World War Java Evan Quinn
TRACK 5: Communications		
ISP Meets the Enterprise: The Rise of Public Network Infrastructure Lee Doyle	IP Centric Networks: Future or Fantasy for Voice Mark Winther	The New LAN Backbone: Bandwidth & Brains Mark Leary
TRACK 6: Services		
Profiting from the Identity Crisis in Services Mike Melenovsky	Solution Delivery: Lessons from the Elite Paul Johnston	Getting Ahead of the Demand Curve for Mission Critical Service and Support Traci Gere

4:00-4:45 Top Headlines for 1998 *John Gantz, Moderator*

Pentium 233MMX With 13.3" Screen!

Tiger's Most Advanced Notebooks—Featuring Low-Voltage Intel Mobile Pentium MMX!

Amazingly Bright 13.3" Active Matrix Display!
Brilliant graphics! Ultra-resolution; 1024 x 768 with 64,000 colors! With 2MB embedded video DRAM, Zoomed Video support and 128-bit, PCI graphics accelerator.

SPITFIRE

200MMX And 233MMX Models To Choose From!
The industry's most powerful CPUs. MMX delivers explosive graphics, multimedia and video!

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Features integrated 16-bit SoundBlaster Pro compatible stereo audio, with Yamaha Wave Table and 3D Surround Sound.

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Item#	Processor	Memory	HD/CD	Display	Lease/mo.	Price
A13-NB 4A	**Intel Pentium 200MMX**	32MB EDO	2.0 GB/20X	13.3" Active Matrix	$100*	$2,849.99
A13-NB 5A	**Intel Pentium 233MMX**	32MB EDO	3.0 GB/20X	13.3" Active Matrix	$110*	$3,149.99

** Call for leasing. Sorry, but as prices are always changing, we do not offer price protection in the event prices rise or fall. Call for details and warranty information.*

DVD With Internet And 200MHz PC!

DVD Is The World's BEST Video And Audio!

A new age of home entertainment is here—new PC Cinema from Tiger. This remarkable new device combines a powerful 6x86 PC—including Internet access—with the latest in video technology: *the DVD player*. DVD (for Digital Versatile Disc) holds massive amounts of information—like movies in multiple languages, multiple director's cuts and more. And that's just the beginning. What PC Cinema does is combine every entertainment device you have now—into one unit. Imagine sitting in your living room and surfing the Intenet—then switching to the integrated Windows 95 PC and playing a few levels of Myst or Terry Bradshaw's football (on CD-ROM, which can be played on your DVD player). Then, another click of your remote (or wireless keyboard, included) and diving into the latest movie release on DVD—with the world's best audio and video quality. You can even combine activities—like watching a movie while finishing up a spreadsheet—all while lounging on the sofa!

Hollywood's blockbuster hits are now available in superior-quality DVD format!

DVD Is The Best In Sight And Sound... DVD is the next generation for movies—delivering true theater quality sight and sound right into your home. Plus, the new Dolby digital sound blows the doors off anything you've ever heard.

Connects to your existing TV and Stereo!

A13-PCC1	IBM 6x86 PR-200 PC Cinema	$999.99
A13-PCC2	AMD K6-233 MMX PC Cinema	$1399.99

PR200, P233 PCs: FROM $499.99

AMD-K6 MMX, IBM 6x86MX, Pentium MMX. Easy-To-Assemble!

You can assemble a brand new multimedia 200 or 233 powerhouse and save up to $300! Choose just the right processor for your kind of work from the best in the industry... a Pentium MMX... or the AMD-K6 MMX... or the IBM 6x86MX. These are complete kits, easily assembled for a full-featured multimedia system. Simply choose the hard disk size you need and a monitor for a ready-to-run system. Is it easy? YES! In fact, you need only a screwdriver and about an hour—it's easier to assemble than that barbeque on your patio! You'll actually enjoy assembling this computer—and learn about how it works in the process. Our state-of-the-art motherboard, high-speed SDRAM memory and floppy drive are all pre-installed and 100% tested. Plus, the kit includes a top-speed 24X CD-ROM drive or NEC 4-CD Changer, 56K BOCA Research faxmodem with voice, 16-bit 3D Stereo Sound, S3 ViRGE 3D video with 4MB of video memory, premium Windows 95 keyboard, PS/2 mouse, stereo speakers, microphone, cables and more.

Tiger's top-of-the-line 233 and Pentium II models also include a Microsoft IntelliMouse that makes scrolling on the Internet faster and easier than ever. Plus, these powerhouses come with our finest AT or ATX motherboards (shown above), which support the newest EIDE Ultra DMA/33 hard disks. These new hard disks boost transfer rates twice the previous 16MB/second limit—up to 33MB per second! We highly recommend teaming up a new Ultra DMA/33 hard disk with these fantastic motherboards.

All you need to build your own multimedia system is this kit, hard disk, monitor and operating system of choice. Simply pop in the hard drive, adapters and CD-ROM! Then power up and enjoy the enormous savings—up to $300!

Tiger Assemble-It-Yourself Multimedia Kits

Item #	Processor	MB	HD Support	Mouse	Price
A13-KT 1	IBM 6x86 PR200+	AT	Ultra	PS/2 Mouse	$499.99
A13-KT 5	IBM 6x86MX PR233	ATX	Ultra	IntelliMouse	$729.99
A13-KT 6	AMD-K6 MMX 233MHz	ATX	Ultra	IntelliMouse	$749.99
A13-KT 7	Pentium MMX 233MHz	ATX	Ultra	IntelliMouse	$829.99
A13-KT 8	Pentium II MMX 266MHz	ATX	Ultra	IntelliMouse	$1149.99
A13-KT 9	Pentium II MMX 300MHz	ATX	Ultra	IntelliMouse	$1399.99

Add a Hard Drive. See below for specials.

Sorry but as prices are always changing on CPUs, we do not offer price protection in the event prices rise or fall. Ask for details and warranty information. **Configurations & prices subject to change; ask your sales rep for latest configurations & prices.**

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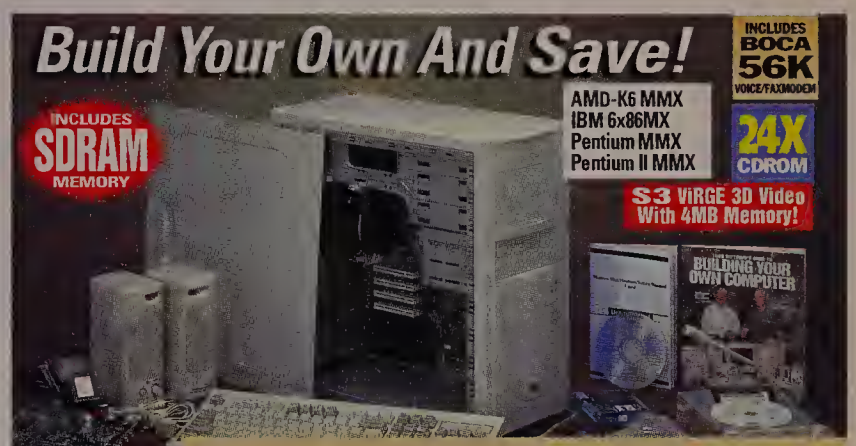

YOU GET ALL THIS:
- Your Choice of Processor: IBM 6x86 or IBM 6x86MX or AMD-K6 MMX or Intel Pentium MMX
- 16 MB SDRAM Memory
- 24X CD-RDM (NEC 4-CD Changer on 6x86 PR200+)
- 56K BOCA Faxmodem
- 3D Sound with Speakers
- S3 ViRGE 3D Video With 4MB
- Premium Keyboard
- PS/2 or Microsoft IntelliMouse
- 512KB Pipelined Burst Cache
- USB Ports on ATX motherboard
- 4 PCI and 4 ISA Slots on ATX (4 PCI, 2 ISA and AGP slots on Pentium II)
- Infrared Port
- 3.5" Floppy Drive,
- 2 Serial, 1 Parallel Port
- 9-Bay Case With 3rd Cooling Fan
- Motherboard, RAM and Floppy Drive Pre-installed and Tested

ADD MEMORY *Kit includes 1 16MB DRAM DIMM*

Item #	Memory	Size	Price
A13-ME 1	SDRAM DIMM (1 module)	16 MB	$44.99
A13-ME 2	SDRAM DIMM (1 module)	32 MB	$79.99
A13-ME 3	SDRAM DIMM (1 module)	64 MB	$199.99

ADD A HARD DRIVE... *Featuring EIDE and Ultra DMA models 1.7GB to6.4GB*

Item #	Manufacturer	Capacity	Price	Item #	Manufacturer	Capacity	Price
A13-HD 1C	Fast EIDE	1.7GB	$129.99	A13-HD 3A	Western Digital UDMA	3.2GB	$209.99
A13-HD 1A	Seagate UDMA	1.7GB	$149.99	A13-HD 4A	Western Digital UDMA	4.3GB	$239.99
A13-HD 3B	Seagate EIDE	3.2GB	$209.99	A13-HD 6A	Western Digital UDMA	6.2GB	$299.99

3.2 GB Ultra DMA HD Incredible Priced At Just $169.99!

ITEM #	CAPACITY	INTERFACE	SEEK TIME	TRANSFER RATE	SPINDLE SPEED	BUFFER	BAY SIZE	WARRANTY	PRICE
J34-1000	3.2 GB	Ultra DMA	11 msec	33 MB/S	5400 RPM	512KB	3.5"	3 years	$169.99

Western Digital Full Kit

ITEM #	CAPACITY	INTERFACE	SEEK TIME	PRICE
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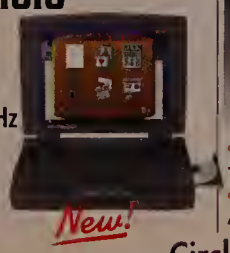

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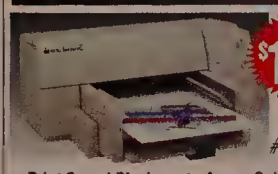

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SO I FIRE UP THIS NEW Dell Dimension, and it doesn't boot. It just beeps at me, one long and two short. Hey, I've got it covered. I just reach for Dell's Diagnostics and Troubleshooting Guide, which says this rhythm means "microprocessor speed jumper missing."

The motherboard map is in a separate Dell Reference Guide. But I can't find a reference to the microprocessor speed jumper anywhere in there. Then, thumbing the rest of the Reference Guide, I happen to notice Appendix A, "Beep Codes and System Messages." Buried in the text is this: "NOTE: The error messages and beep codes found in the Diagnostics and Troubleshooting Guide apply only to Dell OptiPlex systems; they do not correspond to the beep codes and error messages associated with your Dell Dimension computer system. Use this appendix and not the Diagnostics and Troubleshooting Guide to interpret error messages and beep codes."

Hey, it could be worse. These days, this is what passes for a *good* manual. At least I found the information I needed. The beeps translated to "Video card not present," and sure enough, the AGP card had worked its way out of its socket in transit across the country. And at least I got a manual. You can bet some PC vendor out there uses beep codes for boot failures and stores the magic decoder paragraphs on the hard drive where you can't get at 'em.

Logging on to the **Web** is just what you need when **your machine's** open and your modem is emitting **sparks.**

INCREDIBLE SHRINKING DOCUMENTATION

OF COURSE, the near-disappearance of printed manuals is old news. Since the palmy era of the original IBM PC, whose documentation came in linen-bound loose-leaf manuals with slipcases, documentation has retreated to the point where computers now come with skinny pamphlets that refer not merely to the model you bought but to several whole lines of machines, some of which may not even resemble yours. Just flipping through the "If you have" pages to figure out which elements got stuffed inside your PC and which ones didn't can be excruciating.

The software scene is no better. When Office 97 comes installed on a typical system, its entire documentation is tucked inside the front of the CD-ROM jewel case. Of course, there's plenty of on-screen help, but it's always incomplete. To get real help, you'll need to buy a book–and Microsoft Press would be happy to sell you one.

The latest wrinkle is to put the information neither on paper nor on your hard drive. Netscape, to its everlasting shame, pioneered Web-based help. Yeah, having to log on to the Web is precisely what you need when your PC is open, screws are rattling around the table, your modem is emitting sparks, and the Net is so clogged you can't get at the help file anyway.

THE PAPERLESS MANUAL

MY PATIENCE FOR THESE shenanigans is running extremely thin. I recently acquired a U.S. Robotics 56-kbps modem, the kind of product that used to come with a book full of AT codes. Now you get merely a pamphlet that tells you how to put the help information on your hard drive. But USR's disk wouldn't install the help file on either of two machines I tried, and the tech support person I talked to strongly hinted that this wasn't unusual. If you want to find out about AT codes, don't call me.

Vendors want to have it both ways. They complain bitterly about the expense of answering the phone to support their products. Then they cut costs by eliminating the documentation that could avert some of those calls. And they all say the same thing: Nobody reads the manuals. Fine. Manuals aren't novels. They're not meant to be bedtime entertainment; they're meant to be on the shelf when you need them.

But don't count on getting a real manual anytime soon. Vendors have a long history of not taking documentation seriously. The head of what was then a prominent software company once asked me why manuals were always so bad. I asked him how much money the company's top technical writer made. Then I asked how much its top programmer made. The second figure was about four times larger.

"I see your point," said the mogul. But his company's manuals never got one bit better.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and half of the* Digital Duo, *a new technology program on public television.* ■

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